Secure Attachment as a Resource for Healthy Aging: Micro- and Macro-Longitudinal Perspectives on Attachment Processes in Adulthood and Old Age

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„Focusing on intimate interpersonal relations, attachment theory does not aspire to address all aspects of personality development. However, it is an open-ended theory and, we hope, open enough to comprehend new findings that result from other approaches."

Mary Ainsworth & John Bowlby, 1991, p. 339

Abstract

The current thesis identifies attachment security as such a resource for processes of healthy aging. In four empirical studies, this thesis examined the role of attachment security in the context of positive adaption in relational and non-relational domains of life in adulthood and old age. To do so, attachment security was examined as a stable disposition as well as a dynamic state. All four studies suggest that attachment security is related to important pathways of healthy aging at different levels of functioning, such as forgiving and being forgiven in close relationships as well as satisfying basic psychological needs in terms of relatedness, competence and autonomy. It is discussed how attachment functions both as a personal and social resource, as well as how it functions as a stable and dynamic resource in the context of healthy aging. The current work provides a framework for future investigations using attachment theory to examine processes of healthy aging at the macro- and micro-level of development. The current thesis suggests further integration of attachment theory with established macro-longitudinal theories of aging to further advance research on long-term developmental trajectories of healthy aging. What is more, micro-longitudinal research on within-person processes related to attachment security are presented as a promising pathway to understand which role attachment security plays in the multifaceted, multi-determined short-term processes of adaption within a person, ultimately contributing to healthy aging.

Zusammenfassung

Die vorliegende Arbeit identifiziert Bindungssicherheit als eine Ressource, welche für Prozesse des gesunden Alterns von Bedeutung ist. In vier empirischen Studien wird die Rolle von Bindungssicherheit bei Erwachsenen in Bezug auf die gelingende Anpassung innerhalb und ausserhalb von sozialen Beziehungen untersucht. Die Ergebnisse sprechen einheitlich dafür, dass Bindungssicherheit als Faktor für verschiedene Prozesse des gesunden Alterns relevant ist. Es wird diskutiert, inwiefern Bindungssicherheit als persönliche oder soziale sowie als stabile oder dynamische Ressource für gesundes Altern fungieren kann. In einem zusammenfassenden Ausblick beschreibt die Arbeit danach ein bindungstheoretisches Rahmenmodell zur zukünftigen Untersuchung von gesundem Altern hinsichtlich seiner makro- und mikro-longitudinalen Prozesse. Dabei schlägt die Arbeit vor, bindungstheoretische Annahmen stärker mit etablierten Makro-Theorien des Alterns zu verknüpfen. Daneben wird ein neuartiger Ansatz zur Integration von idiographischer Theorie und Methode vorgeschlagen, um personenzentrierte, dynamische Mikro-Prozesse des gesunden Alterns sowohl konzeptuell als auch methodisch adäquat zu untersuchen und die Rolle von Bindungssicherheit für die vielschichtigen und komplexen Anpassungsprozesse innerhalb einer Person besser zu verstehen, die letztlich gesundes Altern bedingen.

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1. Introduction

"My major contribution to psychological knowledge has focused on infants' attachment to their mothers […]. We have made substantial progress towards understanding what these basic developmental processes relevant to attachment are in infancy; now we need to find out what they are throughout later phases of development." (p.709), Mary Ainsworth claimed in a position paper published in the *American Psychologist* in 1989. Since then, research on attachment was advanced from understanding childhood development into examining forms of adult attachment (Cassidy & Shaver, 2008; Hazan & Shaver, 1994).

Despite the implications of attachment theory on lifespan development, most of the research efforts in attachment research focus on romantic attachment during young and middle adulthood. And despite Bowlby's (1969) early verdict on the importance of attachment bonds *from cradle to grave*, surprisingly little is known about the form and function of attachment in old age. However, attachment theory is commonly employed in research on Dementia and Alzheimer's Disease, as these diseases exemplify the centrality of attachment behavior and cognition. For example, the longing for care and the belief that deceased parents are still alive, termed *parent fixation*, is fruitfully examined within an attachment theoretical framework and offers new and improved methods for social therapy in dementia (Browne & Shlosberg, 2006; Miesen, 1993; Osborne, Stokes, Simpson, 2010).

However, when attachment in old age is only examined in those with severe medical condition, little inference on attachment processes in the context of well-being and healthy aging can be drawn validly. The following questions remain: Which role does attachment play for health and well-being in old age and which attachment-related processes might account for positive adjustment throughout life, promoting well-being and health in old age?

This thesis thus examines processes and developments related to attachment that sustain well-being and health in adulthood and old age. Within this thesis, attachment security is conceptualized as a resource for healthy aging. Functioning as a resource, attachment security is assumed to be protective and salutary, affecting processes of coping and stabilization across life, ultimately contributing to healthy aging (cf. Baltes, Mayr, Borchelt, Maas, & Wilms, 1993; Hobfoll, 1989; Martin, 2001; Scholz, König, Eicher, & Martin, 2015).

1.1. Healthy Aging

According the World Health Organization's (WHO) World Report on Ageing and Health (2015), healthy aging is defined as "[…] the process of developing and maintaining the functional ability that enables well-being on older age." (p. 28). Thereby, healthy aging is not equated with the absence of impairment respectively the individual's physical and mental capacities (termed *intrinsic capacity*, p. 28) but as the individuals' ability to function and "to be and to do what they have reason to value" (WHO, 2015; p.28). In line with the WHO definition, this thesis understands healthy aging as a developmental process. Rather than assessing explicit markers of health in old age, this thesis aims at elaborating both theoretically and empirically on short-term and long-term developmental processes that allow for healthy aging. In doing so, the thesis primarily focuses on *processes* of healthy aging as lifelong adaption instead of assessing health as an *outcome* in old age (cf. Huber et al., 2011).

The dynamics of healthy aging are complex and multifaceted. Obviously, healthy aging is determined by a multitude of biopsychosocial factors such as genes and biological inheritances, socialization or environmental factors and finally, by the dynamic interplay of these factors across life (Baltes & Baltes, 1990). One of these factors affecting healthy aging might be an individual's sense of attachment security. In line with the definition of healthy

aging by the WHO (2015), this thesis postulates that attachment security is an essential part of an individuals' intrinsic capacity, thus shaping functional ability in old age.

1.2. Attachment

"All of us, from cradle to grave, are happiest when life is organized as a series of excursions, long or short, from a secure base provided by our attachment figures."

John Bowlby, 1988, p. 62

Originally, attachment theory was formulated by John Bowlby (1969) and subsequently by Mary Ainsworth (1979) to explain the nature and functionality of the infant-caregiver bond. Bowlby assumed that the attachment system is biologically based and active in all humans. Although Bowlby and Ainsworth were primarily concerned with infant-parent bonds, already their original formulation of attachment theory emphasized the relevance of the attachment system for lifespan development. Both scholars drew on ideas from psychoanalysis, ethology, and cybernetics. Most relevant for this thesis, they assumed that early attachment-related experiences shape later intra-and interpersonal functioning (Ainsworth & Bowlby, 1991). Thereby, attachment-related experiences are thought to not only affect socio-emotional development, but also aspects of life that are not primarily social, such as identity formation or the development of skills and competencies. Recent empirical findings from multidecade, prospective longitudinal studies evidence this assumption of early attachment giving direction to human development in social and non-social domains of life (Carlson, Sroufe, & Egeland, 2004; Puig, Englund, Simpson, & Collins, 2013; Sonuga-Barke et al., 2017; Sroufe, 2005; Sroufe, Coffino, & Carlson, 2010, for a review).

1.2.1. Fundamentals of Attachment Theory

Bowlby put forward two central hypotheses in his seminal work on attachment security. First, individual differences were largely the product of the history of interactions between infant and caregiver. Second, he claimed that variations in attachment security were the foundation for later individual differences in personality and the ability for life-adjustment. Both claims are most closely connected to the concept of *internal working models*, explaining why individual differences in attachment security develop and why they should be sustained across time (Bowlby, 1969, 1973, 1980, 1988; Bretherton & Munholland, 2008; Collins & Read, 1990, Dykas & Cassidy, 2011, for a review).

Over repeated interactions with their caregivers, children are thought to develop knowledge structures, termed internal working models, on the general availability, responsiveness and warmth with which caregivers react to their needs. Internal working models are defined as internalized mental representations that individuals hold about self and other (Bowlby, 1973). According to attachment theory, individuals develop attachment orientations (i.e., enduring and consistent patterns of interpersonal cognitions, emotions, and behaviors) as a result of unique experiences with primary caregivers in early childhood, which are at the basis of an individual's internal working model (Bretherton, 2005). If caregivers provide care in a consistent, warm and responsive manner, infants are supposed to learn that they are worthy of love and that others can be counted on when needed (Bell & Ainsworth, 1972; Fonagy, Steele & Steele, 1991). In short, an infant is likely to develop secure working models of attachment when his or her caregiver is able to perceive the infant's signals accurately and respond to them promptly, contingently, and appropriately (Belsky & Fearon, 2008, for a review). In turn, attachment security is marked by *secure base* and *safe haven* strategies enacted by the child (Ainsworth, Blehar, Waters, & Wall, 1978).

Securely attached children use their caregiver as secure base, from which to explore the surrounding world to gain competence and autonomy as they mature, and as safe haven, to which to return to for comfort, reassurance and safety during threat or stress.

Once formed, internal working models are assumed to be self-stabilizing due to accommodating new information into existing models, which is at the same time the reason why early attachment should shape later development. In summary, attachment theory assumes that early attachment affects subsequent development into adulthood, because these early experiences provide a starting place that affect that likelihood for what comes next on a developmental pathway. There is a multitude of pathways through which early experiences affect the development of intra- and interpersonal abilities via cascades and mediating processes, encompassing a multitude of different domains of psychological functioning (e.g., brain development, emotion regulation, identity formation). These basic assumptions of attachment theory offer an organizational perspective on lifespan development as non-linear and dynamic one, continuously affected by person-environment interactions across the lifespan (Simpson, Collins, Farell, & Raby, 2015; Sroufe, 1979). In line with theory, empirical research supports this perspective on the legacy of early attachment (e.g., Fraley, Roisman, Booth-LaForce, Owen, & Holland, 2013; Fraley, Roisman, & Haltigan, 2013; Simpson, Collins, Tran, & Haydon, 2007).

1.2.2. Individual Differences in Attachment Security

Not all individuals develop secure internal working models of attachment, respectively secure attachment orientations. Individual differences in attachment orientations are most commonly measured along the dimensions of attachment anxiety and attachment avoidance (Brennan, Clark & Shaver, 1998; Fraley, Hudson, Heffernan, & Segal, 2015). These two different dimensions of attachment-insecurity correspond with different motivational

strategies people use to regulate thoughts and feelings. Both attachment anxiety as well as attachment avoidance have been linked to various maladaptive outcomes across life (Fonagy, Gergely, Jurist, & Target, 2002).

Attachment anxiety has been linked to inconsistent care in infancy (Ainsworth et al., 1978). In adulthood, thus, attachment anxiety is characterized by the tendency to ruminate about close relationships due to fears of rejection, abandonment, and not being cared for sufficiently (Fraley & Shaver, 2000). These fears prompt individuals with a more anxious attachment orientation to require a partner's constant reassurance of affection and love to feel a sense of closeness and stability within a relationship (Hazan & Shaver, 1994; Mikulincer & Shaver, 2005). During adulthood, greater attachment anxiety is associated with more negative self-views in terms of lower and more fragile self-esteem (Foster, Kernis, & Goldman, 2007), greater feelings of incompetence, neediness and self-criticism (Griffin & Bartholomew, 1994), and a higher likelihood to suffer from psychological disorders (Fraley & Bonanno, 2004).

Attachment avoidance is assumed to stem from neglectful care (Ainsworth et al., 1978). In adulthood, thus, attachment avoidance is associated with emotion regulation strategies geared towards the suppression of negative affect and self-reliance (Bartholomew, 1990). Attachment avoidance is characterized by a tendency to feel discomfort in situations of dependence or emotional closeness, due to fears surrounding the loss of independence (Fraley & Shaver, 2000). Accordingly, individuals with a more avoidant attachment orientation tend to avoid intimacy and closeness, as a way of distancing themselves physically and emotionally from a partners and the neglect and unpleasant affect that may arise from it (Hazan & Shaver, 1994; Mikulincer & Shaver, 2005). This desire to maintain independence, even within a relationship, leads individuals with a more avoidant attachment orientation to

defensively avoid information of strong emotional valence. During adulthood, greater attachment avoidance is associated with the experience of shallow affect (defined as limited range or depth of feelings; Mikulincer, Shaver, & Pereg, 2003), as well as lower relationship satisfaction and higher disengagement in romantic relationships (Barry & Lawrence, 2013; Butzer & Campbell, 2008). Further, attachment avoidance corresponds with engagement in romantic betrayals (Beaulieu-Pelletier, Philippe, Lecours, & Couture, 2011), substance abuse (Schindler & Bröning, 2015), or increased physiological aggression (Sommer, Babcock, & Sharp, 2017).

Finally, those who score low on attachment anxiety and attachment avoidance in this two-dimensional system are said to exhibit attachment security. In contrast to those high in attachment anxiety or attachment avoidance, securely attached individuals demonstrate the capacity to balance emotional proximity and autonomy (Mikulincer & Shaver, 2005).

1.2.3. Attachment Security in Adulthood

At every stage in life, attachment security is marked by the internalized feeling of security, in terms of a *secure base* and a *safe haven* that can be found in others. This has been conceptualized as an enduring state of felt security (Sroufe & Waters, 1977). Felt security can be defined as the person's belief that an attachment figure is available and responsive towards the person's needs (Sroufe & Waters, 1977; Mikulincer & Shaver, 2007; Hazan & Shaver, 1994; Holmes & Murray, 2007). Attachment security is assumed to guide adaptive and pro-social processes in everyday life (Bretherton, 2005; Mikulincer, Shaver, Sapir-Lavid, & Avihou-Kanaza, 2009; Waters & Waters, 2006). Mikulincer and colleagues (2009, p. 617) summarize: “[…], securely attached people possess a more accessible, richer, and more elaborated secure-base script than less secure individuals, either anxious or avoidant, which

contributes to their emotional stability, mental health, satisfying interpersonal relations, and self-esteem." (p. 617).

An individual who has internalized the feeling of security in terms of a safe haven and a secure base has script-knowledge on how to navigate demanding situations in a constructive manner (Waters & Cummings, 2000). Attachment security, thus, has been linked to various outcomes of developmental significance, even in non-social domains of psychological functioning (Thompson, 2008). There is mounting evidence supporting the theory's seminal claims that attachment security also relates to aspects of positive development and functioning above and beyond socio-emotional well-being. With regard to non-social domains of life, attachment security is linked to enhanced curiosity and learning (Mikulincer & Shaver, 2007b), better job performance (Neustadt, Chamorro-Premuzic, & Furnham, 2011) and greater academic achievements (McCormick, O'Connor, & Barnes, 2016; Nievar, Moske, Johnson & Chen, 2014, Wright, 2017). In a similar vein, attachment security predicts positive adjustment to critical life events and role transitions, e.g., in college freshmen (Xie & Yang, 2015), during job loss, or in the launching of children from the family of origin (Hobdy et al., 2007). Moreover, a strong and stable sense of coherence (Davila & Cobb, 2003), greater openness to new experiences (Noftle & Shaver, 2006), and healthy self-agency (Knox, 2011) are found to characterize those who are relatively securely attached. Finally, attachment security has been linked to increased mental and physical health status (Diamond & Fagundes, 2010; Diamond & Hicks, 2004; Fagundes, Bennett, Derry, & Kiecolt-Glaser; 2011), more frequent engagement in health promoting behaviors (Scharfe & Eldredge, 2001), and efficient health care utilization (Ciechanowski, Walker, Katon, & Russo, 2002). In summary, empirical studies support the view that attachment security supports functioning as a resource to positive adaption in various domains of life.

However, effects and correlates of attachment are yet most commonly studied with regard to the social domain of life (cf. Cassidy & Shaver, 2008; Gillath, Karantzas, Fraley, 2016). With regard to emotional and social functioning, attachment security in adulthood is robustly linked to higher relationship satisfaction and family functioning (Pedro, Ribeiro, & Shelton, 2015), greater social skills and emotional intelligence (DiTommaso, Brannen-McNulty, Ross, & Burgess, 2003; Kafetsios, 2004), and finally, greater knowledge and abilities on how to maintain and stabilize close bonds across the lifespan (Anders & Tucker, 2000; Frei & Shaver, 2002; Kirkpatrick & Hazan, 1994).

1.3. Relationship Maintenance and Social Stabilization Processes

Throughout the lifespan, individuals have a strong need to feel embedded in lasting and satisfying relationships (Bowlby, 1969; Baumeister & Leary, 1995). However, individuals need to engage in certain behaviors in order to prevent relationship deterioration and to sustain a relationships' positivity. In relationships, individuals engage in various pro-relationship strategies that aim at relationship stability and longevity, such as compromising, forgiving, or sharing tasks (Dindia, 2000). According to Finkel, Simpson, and Eastwick (2017), the engagement in relationship maintenance behaviors is one of four core principles explaining how relationships work. Per definition, the majority of relationship maintenance strategies involve a transformation process in which individuals overcome their immediate self-interests in favor of those that are supportive to the partner and the relationship (Dindia, 2000; Murray, Holmes, Griffin, & Derrick, 2015).

To date, scholars have identified a number of individual characteristics that predict individuals' engagement in relationship maintenance strategies. Adult attachment orientations are among those characteristics. Attachment security has been shown to predict a person's motivation and ability to engage in such relationship maintenance strategies (Adams &

Baptist, 2012; Dainton, 2007; Tran & Simpson, 2009). For example, attachment-security is linked to higher levels of sensitive and responsive partner support (Collins & Feeney, 2000; Simpson, Rholes, Oriña, & Grich, 2002), as well as greater empathy and care that is perceived as supporting but at the same time reinforcing the partner's autonomy (Feeney & Hohaus, 2001). Generally, attachment security seems to foster positive and optimistic beliefs about relationship partners (Hazan & Shaver, 1994; Kimmes, Durtschi, Clifford, Knapp & Fincham, 2015) and thus, is linked to increased expression of respect, love, and gratitude towards relationship partners (e.g., Mikulincer & Shaver, 2003). In times of conflict and relationship distress, greater attachment security is linked to highly constructive and solution-focused ways of conflict resolution such as openly listening to the partner's perspective (Feeney & Karantzas, 2017, for a review). Finally, attachment security has been linked with a greater tendency to forgive (e.g., Kachadourian, Fincham, & Davila, 2004), which is crucial for long-term relationship functioning (Fenell, 1993; Paleari, Regalia, & Fincham, 2005).

1.3.1. Forgiveness as Relationship Maintenance Strategy

Forgiveness as a psychological complex relationship maintenance strategy has its conceptual roots in moral philosophy and is emphasized in many of the world's religions. However, also secular sciences such as psychology developed profound interest in the construct of forgiveness, due to the concept's crucial importance to understand maintenance of human ties across the lifespan (cf. Fincham, 2000). In psychological terms, forgiveness can be defined as a relationship maintenance strategy (Finkel et al., 2017) that allows relationship partners to restore balance and trust after a conflict or transgression has occurred (Fincham, 2000).

Transgressions are unavoidable and expected occurrences within interpersonal relationships. Generally speaking, transgressions are seen as violations of moral codes,

psychological boundaries, and/or physical boundaries, which cause feelings of being hurt, sadness, and anger (Feeney, 2005). This definition results in many common experiences being considered transgressions as individuals cannot always live up to the everyday expectations of others and hence are perceived to act in a hurtful manner. Therefore, forgiveness may play a central role for stabilizing well-being in close relationships across life, as it balances temporary states of conflict and disequilibrium within social relation towards a significant other. Forgiveness allows individuals to relinquish resentment associated with a transgression, as well as those responsible for the transgression (Hill, Allemand, & Heffernan, 2013). More specifically, forgiveness is the process of consciously shifting the negative thoughts, behaviors, and feelings that one has towards the transgressors to more positive thoughts, behaviors, and feelings (Maio, Thomas, Fincham, & Carnelley, 2008).

Forgiveness seems to play an important role to serve the overall goal of maintaining satisfying relationship with significant others, which tends to be a prioritized goal for older adults (Carstensen, Isaacowitz, & Charles, 1999). As various studies have shown, forgiveness is of critical relevance among relationship maintenance processes that protect and promote relationships over time. For example, forgiveness supports quality and satisfaction in social relations across a broad variety of social contexts, such as those found in marriage (Fincham, Hall, & Beach, 2006; Fingerman & Charles, 2010) and in family (Maio et al., 2008). Empirical evidence of the functionality of forgiveness converges with results from a survey study by Fenell (1993) that investigated characteristics of 1st marriages of over 20 years duration. When asking aged couples for the cornerstone to a successful long-term marriage, they indicated that the willingness to forgive relational transgressions is key to relational well-being and longevity (Fenell, 1993).

Forgiveness can be examined on a trait and state level. Forgiveness is often defined and studied at a dispositional level where forgiveness is the habitual tendency to forgive across a time and situations (hereafter, *dispositional forgiveness*; Brown, 2003). A person with a high level of dispositional forgiveness would be more willing to forgive others across transgressions, relationships and time than a person who is low in dispositional forgiveness (Allemand, Sassin-Meng, Huber, & Schmitt, 2008). Dispositional forgiveness, therefore, can be defined as an enduring cognitive, emotional and behavioral patterns (Allemand & Steiner, 2012). However, forgiveness can also be captured as a state, reflecting how forgiving a person is with regard to a specific transgression within a given moment. Referring to McCullough, Fincham, & Tsang (2003), the process of forgiveness as a state means intrapersonal variation along the three dimensions of benevolence, revenge and avoidance motivation. When experiencing a transgression, people may initially react with an increased motivation to seek revenge and to avoid the transgressor, as well as experiencing decreased motivation to show benevolence to the offender. In the process of forgiving, these motivational tendencies change direction in a way that the forgiving individual becomes less motivated to seek revenge or to avoid the transgressor. Meanwhile, motivations to display benevolent feelings and behaviors to the offender grow stronger (McCullough, Luna, Berry, Tabak, & Bono, 2010). In that sense, state forgiveness can be referred to as a situational psychological process of change and trait forgiveness as a relatively stable and trait-like characteristic of a person (Allemand & Steiner, 2012).

1.3.2. An Attachment Perspective on Forgiveness [1]

Due to the many positive outcomes associated with forgiveness, understanding the underlying processes, dynamics, and motivations of forgiveness has become a prominent avenue for recent forgiveness research (Riek & Mania, 2012 for a review). Due to attachment theory's pointed axioms on intra- and interpersonal dynamics, especially in the context of relational threat, the theory can be used to make strong predictions about the underlying mechanisms of forgiveness. In the following, research on the link between attachment and forgiveness is reviewed. It will be outlined how attachment theory can be used as a framework to understand forgiveness as a means of relationship maintenance and why attachment insecurity may be linked with non-adaptive forms of forgiveness while attachment security should be at the basis of genuine and adaptive forgiveness.

A wide array of empirical studies evidenced that attachment security predicts more forgiving behaviors and attitudes towards relationship partners following a variety of transgressions (Burnette, Davis, Green, Worthington, & Bradfield, 2009; Van Monsjou et al., 2015). Individuals with a more secure attachment orientation are able to trust and empathize with a partner, while using self-evaluation to assess the severity of the transgression (see Riek & Mania, 2012; McCullough et al.,1998). The trusting nature of those individuals who display a more secure attachment orientation, combined with the capacity to empathize, allows these individuals to relinquish grudges, hatred, and disappointment associated with a transgression (Kimmes & Durtschi, 2016). In other words, attachment security is a central component that allows one to have the capacity to genuinely forgive a partner following a

[1] A similar version of this chapter has been submitted for publication to "Translational Issues in Psychological Science" (Brazeau, Martin & Hill).

transgression, and experience the benefits of forgiveness for oneself, as well as for the relationship one is involved in (Martens, 2013; Siassi, 2013).

Across situations, individuals with a more anxious attachment orientation tend to be less forgiving of relationship partners due to the intense negative emotional responses (e.g., dysfunctional anger, despair, and sadness) that these individuals experience in reaction to transgressions (Mikulincer, Shaver & Slav, 2006). Further, the ruminative tendencies of those with a more anxious attachment orientation tend to result in the harboring of these intense emotions towards a relationship partner for extended periods of time (Burnette et al., 2009). These drawn-out negative feelings work in direct opposition to the processes responsible for giving up resentment, and thus impede forgiveness following a transgression. Similarly, individuals with a more avoidant attachment orientation tend to be less forgiving of partners across situations. However, this is due to avoidance strategies that prioritize handling relational distress on one's own in order to maintain emotional independence from a partner. This disengagement during relational conflict stands in sharp contrast to the nature and functionality of dispositional forgiveness, which requests reciprocity to regain closeness (Mikulincer et al., 2006).

Forgiveness is generally thought to be an adaptive process (Worthington, 2005). However, previous research has indicated that forgiveness is not always positive (Luchies, Finkel, McNulty, & Kumashiro, 2010; McNulty, 2010). In fact, forgiveness can be a maladaptive process, harming the individual, as well as the couple (Akhtar, 2002; Paleari, Regalia, Fincham, 2011). Forgiveness has been found to have negative implications as it can lead to diminished self-respect and self-concept clarity when the transgressors does not make sufficient amends following a transgression (Luchies et al., 2010). Forgiving women are found to be more likely than unforgiving women to return to an abusive partner following

violent or hostile transgressions (Gordon, Burton, & Porter, 2004), and experience stable or growing levels of psychological and physical aggressions over the first five years of marriage (McNulty, 2010). In line with that, forgiveness has been argued to be a process that can be either positive or negative, depending on characteristics of the relationship in which it occurs (McNulty & Fincham, 2012). In support of this argument, forgiveness in relationships has been shown to relate to positive outcomes, such as marital satisfaction, under the condition that relatively few transgressions have previously occurred within that relationship (McNulty, 2008). Attachment orientation may be such a relationship characteristic that can explain the possible negative implications of forgiveness, as the motivations and goals associated with forgiving one's partner should function according to one's attachment orientation.

Attachment anxiety predisposes an individual to have opposing tendencies that ultimately do not allow for genuine forgiveness. Because individuals with a more anxious attachment orientation need closeness and affection, those who display this orientation often become submissive and overly dependent within a relationship (Collins, Ford, Guichard, & Allard, 2006). Thus, these individuals seem to prematurely “forgive and forget” transgressions that are inflicted upon them without a process of intensive intrapsychic and relational evaluation (McClure, Bartz & Lydon, 2013). Being quick to forgive serves anxious individuals by maintaining the relationship, but does not allow them to cope with the extreme bouts of negative emotions that are experienced when a partner fails to meet expectations or when a conflict occurs within a relationship (Mikulincer et al., 2006; Siassi, 2013). This predisposes individuals with a more anxious attachment orientation to engage in premature forgiveness; a non-genuine form of forgiveness that is given promptly before evaluation of the transgressor and the transgression occurs. Additionally, it can be speculated that anxious individuals who repeatedly forgive transgressions, without learning from previous

experience, may be submitting themselves to further pain in the future, which may cause these individuals to experience a lowering of self-worth (Mikulincer et al., 2006). Hence, prioritizing relationship maintenance and closeness in all circumstances can be self-harming, as premature forgiveness is generally viewed as a negative relationship process (Luchies et al., 2010).

Attachment avoidance predisposes an individual to remain self-reliant and independent from a partner leading to the tendency to deny the negative emotions that are often associated with a transgression (Martens, 2013; Mikulincer & Shaver, 2005). This tends to result in individuals with an avoidant attachment orientation not adequately registering that they have been wronged, making the process of genuine-forgiveness more difficult (Siassi, 2013). In general, acknowledging hurt feelings is the starting point from which forgiveness occurs (McCullough et al., 1998). Hence, the denial of these feelings seems to impede forgiveness at the earliest stages. However, to avoid further conflict, individuals with a more avoidant attachment orientation tend to forgive, while overlooking the negative emotions associated with the conflict. In that sense, attachment avoidance fosters a kind of superficial pseudo-forgiveness; a non-genuine form of forgiveness that is given without meaning to avoid further conflict and maintain emotional self-reliance. The more an individual displays avoidant tendencies, the more he or she will be attracted to this "just get on with it" attitude, rather than evaluating the pain caused by the transgression (Akhtar, 2002; Martens, 2013, Siassi, 2013). Taken together, the motives associated with insecure attachment (i.e., attachment anxiety or attachment avoidance) can lead to premature or pseudo forms of forgiveness that do not allow an individual to properly relinquish the negative feelings associated with a transgression.

2. Research Plan

Attachment theory is a lifespan theory that offers a perspective on psychological adaption, explaining what optimal human functioning entails. One of the core ideas of the theory is that attachment security lies at the heart of adaptive functioning in both social and non-social domains of life. Theoretically, attachment theory assumes security to be causally antecedent to positive adjustment across the lifespan, laying the *foundation* upon which a variety of skills, competencies and resources develop. Throughout life, the internalized feeling of security should create developmental cascades that have implications downstream for various important outcomes (Bowlby, 1969; Masten & Cichetti, 2010). In line with theory, attachment security in adulthood can be linked to many benefits such as higher social competence, fewer interpersonal problems and more flexible adjustment to situational demands of everyday life (Sroufe, Egeland, Carlson, & Collins, 2005).

As outlined earlier, attachment security allows for a smoothly functioning balance between proximity seeking and exploratory behaviors (Ainsworth et al., 1978). Well-being is significantly influenced by an individuals' ability to balance different needs next to each other (Kumashiro, Rusbult & Finkel, 2008; Sheldon & Niemic, 2006). Due to a person's ability to efficiently and routinely engage in cognitions and behaviors that seem adaptive for a certain situation or certain goals, attachment security should enhance dynamic stabilization of well-being across the life span (Bowlby, 1988).

Thereby, attachment security itself does not have to be a variable factor itself in a person, rather the relative stability of security allows for flexibility in efficient, adaptive and goal-directed functioning in various life situations. Research evidenced that there is a stable factor underlying temporal variations in attachment security in adults (Fraley, Vicary, Brumbaugh, Roisman, 2011). However, within-person fluctuations in attachment security are

substantial in size and meaningfully related to perceptions, expectations and behaviors across time and situations (Gillath, Hart, Noftle & Stockdale, 2009). Attachment as a multidimensional construct comprising both stable elements and state-dependent properties should therefore relate to positive adaption at the within- and between-person level (Bowlby, 1988; Fraley 2002, Fraley et al., 2011).

Both at the within- and between-person level, greater attachment security should enable individuals to efficiently and flexibly choose strategies to meet life goals and everyday challenges. In other words, attachment security can be seen as the causal factor antecedent to a system's ability to optimally adjust to varying demands and situations in daily life. An individual's ability for adaption across the life span, thus, should be majorly influenced by his or her degree of attachment security. In that, attachment security can be understood as a resource for healthy aging in terms of an intrinsic capacity, while conceptualizing health in old age as *the process of developing and maintaining the functional ability*, resulting from successful adaption throughout life (WHO, 2015).

2.1. Methodological Considerations on Longitudinal Research [2]

Longitudinal research is a unique research method that allows studying individual differences over time and how change varies within and across individuals. Longitudinal research refers to a broad category of research designs that involve at least one repeated observation of the same entity over time, assessing change and stability within individuals in one or more variables as a function of time (Baltes & Nesselroade, 1979).

There are three important issues to consider in longitudinal research (Collins, 2006). First, a theoretical model of change is necessary to describe the nature of the change

[2] A similar version of this chapter is in press as an entry on *Longitudinal Research* in "Wiley-Blackwell encyclopedia of personality and individual differences: Vol. II. Research methods and assessment techniques" (Martin, Grünenfelder-Steiger, & Allemand).

phenomenon that is to be observed, such as whether and in what ways the variables are expected to change and what the possible determinants of change might be. Second, a temporal design is required to observe the change phenomenon of interest. The temporal design affords a clear and detailed view of the targeted process, including timing, frequency, and spacing of repeated observations. Third, the statistical model is the direct operationalization of the theoretical model. Though all three issues are important, the theoretical model of change provides the foundation for choosing the appropriate temporal design and thus the most appropriate statistical model (McArdle & Nesselroade, 2014).

Macro-Longitudinal Perspectives: Longitudinal Research to Study Developmental Change

Longitudinal research differs as a function of the temporal design (cf. Study 1, Study 3 and Study 4 of this thesis). It can be distinguished between more traditional long-term longitudinal studies (e.g., Study 1 of this thesis) and intensive short-term longitudinal studies (e.g., Study 3 of this thesis). Traditional longitudinal research designs are used for tracking individuals over relatively long time intervals (Hertzog & Nesselroade, 2003). Traditional longitudinal studies are typically characterized by widely spaced single measurements, often spanning several years. Those designs are referred to as panel designs or multi-wave designs, since their nature is characterized by repeated waves of single measurements. They typically address developmental change.

The theoretical models of change underlying long-term longitudinal research refer to the development of rather enduring aspects of personality, that is, personality traits that are typically defined as relatively stable patterns of thoughts, feelings, and behaviors over time such as trait attachment security or dispositional forgiveness (cf. Study 1). Hence, in a theoretical model for long-term trait change we would not expect change at a rapid rate but

we would rather expect slow developmental processes over longer time periods. Therefore, in a theoretical model of change, it is important to consider the timing, frequency, and spacing of repeated observations that are needed to accurately capture systematic and interindividual differences of change in personality traits. This, in turn influences the selection of the temporal design and statistical model. Time intervals that are too short or too long in relation to the nature of the phenomenon being studied can produce data that, in some cases, is overly sensitive to measurement errors and carryover effects and, in other cases, is insensitive to change and variability (Collins, 2006).

Micro-Longitudinal Perspectives: Intensive Longitudinal Research to Study Dynamic Processes

Intensive longitudinal research designs are used for tracking individuals over relatively short time intervals such as minutes, hours, or days (Bolger & Laurenceau, 2013). The theoretical models of change underlying intensive, short-term longitudinal research refer to dynamic processes such as regulative and emotional states in a given situation that show temporary changes and fluctuations in thoughts, feelings, and behaviors in response to intrapersonal or external situations. In a theoretical model for short-term dynamics we would expect fluctuations at a rapid rate – assessed with multiple repeated observations over a short time period (cf. Study 3). Hence, to accurately capture the unfolding of dynamic processes, it is important to select temporal designs that are capable of assessing changes and fluctuations from moment-to-moment in short-term processes. Intensive longitudinal studies can involve end-of-day assessments over a few weeks, or frequent assessments throughout a day, an hour, or even minutes. The frequency of measurement occasions within the study design determines how fine-grained the analysis of temporal associations can be. Therefore, these designs may be less suited to tap meaningful change that develops in a person across a longer

period of time but well-suited to assess intraindividual variability in terms of fluctuations as a deviation from the person's general mean level or prior levels. Importantly, not all short-term fluctuations contain practically or theoretically important information, but can be caused by measurement error. The study of dynamic processes requires statistical models and methods that can deal with multiple intensive repeated observations over short time intervals such as multilevel modeling, as employed in Study 3 of this thesis (Bolger & Laurenceau, 2013).

Longitudinal Research Methods

There are several intensive longitudinal research methods to study everyday thoughts, feelings, physiology, activities, and behaviors under actual living conditions in daily life. Two examples, as they are of central importance to this thesis, are presented. The first example is the diary method (Bolger, Davis, & Rafaeli, 2003), which is employed in Study 2. In diary studies, individuals provide frequent reports on variables or constructs of interest on a regular basis, often combined with events and experiences that participants encounter in their daily lives. Data can be collected with the help of traditional paper-and-pencil methods or electronically via the internet or with mobile technologies. Diary methods allow studying dynamic processes outside the laboratory in real life settings and contexts. They tend to reduce the response bias due to retrospection, as diary methods strive for minimizing the time elapsed between experience and measurement of a variable of interest, causing an increase in ecological validity (Reis, 2012). Additionally, the explicit consideration of the relatedness of change processes to events and dynamics of daily life provides additional or even complementary information to that obtainable by more traditional longitudinal research designs. For example, daily diary studies in the field of personality psychology may reveal that certain personality characteristics are relatively enduring, while others are more strongly related to situational determinants and events, and thus are more variable and fluctuating.

The second example is ambulatory assessment, also referred to as experience sampling or ecological momentary assessment (Fahrenberg, Myrtek, Pawlik, & Perrez, 2007; Mehl & Conner, 2012) which is employed in Study 3. Ambulatory assessment refers to a broad category of increasingly digitalized methods of experience sampling, including classical self- and other-reports, physiological and biological data, and observed behaviors (Trull & Ebner-Priemer, 2014). Ambulatory assessment is not necessarily longitudinal, but most research questions using ambulatory assessment involve the study of a certain phenomenon in daily life and across time. Due to technological innovations, such as portable devices, data can be collected actively and passively in real time or near real-time. Automating data collection allows studying very complex research questions, covering multiple domains of psychological functioning, but may also involve challenges for future research, thus stimulating the development of psychological theory as well quantitative methods of longitudinal research (Wrzus & Mehl, 2015).

2.2. Research Question and Empirical Studies

Given the overall considerations of this thesis, a number of specific research questions and hypotheses emerge to depict both long-term developments and short-term processes that result in the adaption to important life contexts and domains in adulthood and old age. In this thesis, theoretical and empirical considerations are made on how attachment security can contribute to adaptive psychological functioning in terms of relationship maintenance and need satisfaction in middle aged and older adults. It is assumed that attachment security scaffolds both intra- and interpersonal resources and competencies that sustain adaptive functioning and thus, well-being, from adulthood into old age. As such, this thesis raises the following question: Does attachment security contribute to adaptive psychological

functioning in terms of functional ability in the domains of relationship maintenance and need satisfaction in middle aged and older adults?

In order to answer this question, this thesis conceptually links attachment to ability in social and non-social domains functioning. First, the thesis examines attachment security as one of the most important relationship maintenance strategies in romantic dyads, reflecting one of the primary attachment-context of adulthood (Study 1 and Study 2). Thereby, forgiveness is examined as a habitual relationship maintenance strategy (Study 1) as well as an acute reaction to perceived transgressions in couples' daily life (Study 2). Second, attachment security is examined in its trait and state properties and how these relate to positive adjustment via the satisfaction of the basic psychological needs of competence, autonomy, and relatedness in a sample of older adults (Study 3). Finally, the role of attachment and forgiveness for adaptive functioning will be examined in an applied context of an intervention study in a sample of older adults (Study 4). First, the general effectiveness of such an intervention for overall well-being and psychological health will be evaluated (Study 4). In line with that, differential effectiveness and how these may be related to attachment security and attachment-related processes will be discussed. In each of the studies, the role of attachment security as a factor that promotes life-span adaption and thus healthy aging is explored. In detail, two domains of functional ability (forgiveness and need satisfaction) are examined that may link adult attachment security to health and well-being from middle to old adulthood.

In order to examine attachment security in the context of healthy aging, longitudinal research methods need to be employed, depicting psychological processes at various rates of change (cf. Martin & Hofer, 2004). If possible, these focus not solely on the individual but also on the embeddedness of the individual in important attachment relationships. In that,

bidirectional effects within couples can be examined to depict effects of romantic partnerships as central environment for attachment-related functioning. Hence, Study 1 and 2 of this study involve dyadic analyses, which focus on romantic couples as unit of analyses, employing the Actor-Partner-Interdependence-Model (Cook & Kenny, 2005; Kenny, Kashy, & Cook, 2006). Finally, Study 1, Study 2 and Study 4 address between-person associations of adaption with the help of such as longitudinal structural equation modeling (Little, 2013). Study 3 addresses within-person perspectives of adaption with the help of multilevel modeling (Study 3; Bolger & Laurenceau, 2013; Bryk & Raudenbush, 1992), emphasizing the relevance of in-depth person-centered approaches to understand psychological change and stabilization processes (Allport, 1937; Conner, Tennen, Fleeson, & Feldman Barrett, 2009). Hence, the empirical work of this thesis is based on both nomothetic and idiographic approaches to study processes of healthy aging.

2.2.1. Study 1: How does attachment security relate to dispositional forgiveness over time?

Habitual forgiveness can be seen as a uniquely adaptive strategy to maintain close emotional bonds with others (Allemand & Steiner, 2012). Recent research has evidenced that attachment security predicts higher levels of trait forgiveness (e.g., Kachadourian et al., 2004). However, these studies were cross-sectional and did not take into account that dispositional forgiveness may develop in romantic partners, based on and in accordance with individual levels of attachment security. Study 1 fills this research gap by focusing on forgiveness and attachment in romantic partners across one year in a sample of adults. We focused on established couples, as romantic relationships are among the most central attachment-relationships in adulthood (Doherty & Feeney, 2004). With this study, we aimed to extend current research in at least two aspects. First, we examined commonality in stability

and change in attachment and dispositional forgiveness. Second, we conducted dyadic analyses, examining bidirectional effects of attachment and dispositional forgiveness. As forgiving is inherently interpersonal, partner levels of attachment security should profoundly account for a person's tendency to forgive – both cross-sectionally and longitudinally. In that, we explored if general and dispositional forgiveness as important relationship maintenance strategy co-develops within romantic partners.

2.2.2. Study 2: How does attachment security relate to transgressions and forgiving reactions in daily life?

The experience of hurt feelings due to relational transgressions is a highly stressful relational phenomenon (Feeney & Karantzas, 2017), which may destabilize relationships and which some individuals experience more often than others. Individual differences in attachment security should lie at the heart of the perception of transgressions and the subsequent coping and emotion regulation strategies that couples engage in during everyday life. However, perceiving transgressions and reacting towards them as a function of an individual's level of attachment security has been examined in standardized paradigms within the laboratory (e.g., Domingue & Mollen, 2009; Pietromonaco & Feldman Barrett, 1997). In order to test if associations also hold in couples' natural life, we conducted Study 2. Perceived transgression frequency and state forgiveness as initial response to these perceived transgressions were examined from an attachment perspective. We thus extended current research by showing how attachment security predicts momentary forgiveness in romantic partners' everyday life and thus may contribute to healthy aging via this mechanism of relationship maintenance.

2.2.3. Study 3: How does attachment security relate to need satisfaction in old age?

As already pointed out, one of the core ideas of attachment theory is that it enables psychological adaption and well-being. This empirical study tests this assumption with a sample of older adults. It examines between- and within-person associations in momentary attachment security and momentary feelings of relatedness, competence and autonomy in older adults. Momentary attachment security should function as a dynamic resource, establishing a sense of confidence in one's own abilities, grounded autonomy and connectedness with significant others which in turn, leading to increased well-being and adjustment in late life. Further, we tested for the moderating effect of age and subjective health on the association between attachment security and need satisfaction to test whether attachment security gains increased importance for the individual when other resources are low or declining.

2.2.4. Study 4: Do older adults benefit from intervening on forgiveness?

Especially in old age, both unforgiveness to others as well as feeling unforgiven by others are linked to poor health outcomes (Ermer & Proulx, 2016; Toussaint, Williams, Musick & Everson, 2001). A brief intervention might help to support individuals when they attempt to forgive and feel stuck at a certain stage in the process of forgiving. Currently, there exist only few intervention studies on forgiveness with a focus on older adults (cf. Allemand, Steiner, & Hill, 2013; Hebl & Enright, 1993; Ingersoll-Dayton, Campbell, & Ha, 2009). The small body of research hints at the salutary effects of intervening on forgiveness in old age. Resolving past transgressions may contribute to the decrease of depressive symptoms in late life, such as rumination and enduring negative affect (Ingersoll-Dayton, Torges, & Krause, 2010). However, attachment-related processes might moderate the effectiveness of the intervention for the individual. For this reason, the present studies aim to evaluate the general

as well as the potentially specific, attachment-related effects of a brief forgiveness intervention for older adults.

3. Study 1: Attachment Security and Dispositional Forgiveness

Individual and Dyadic Longitudinal Associations between Attachment and Dispositional Forgiveness in Romantic Relationships [3]

3.1. Introduction

Substantial differences exist in the extent to which individuals tend to forgive within romantic relationships. It is still largely unknown though what governs dispositional forgiveness in close relationships and which domains of personality may account for these differences in individuals' tendency to forgive. Research has begun to study associations between attachment orientations and forgiveness. Recent cross-sectional studies have suggested that a secure attachment is associated with more willingness to forgive others (e.g., Burnette, Davis, Green, Worthington, & Bradfield, 2009; Kachadourian, Fincham, & Davila, 2004; Lawler-Row, Younger, Piferi, & Jones, 2006; Liao & Wei, 2015; Mikulincer, Shaver, & Slav, 2006). However, given the cross-sectional nature of most previous studies, it is not possible to draw clear conclusions about the longitudinal associations between attachment and dispositional forgiveness in romantic partners. This study thus sought to extend the literature in two ways. First, from an individual perspective, we longitudinally examined the associations between attachment and dispositional forgiveness in a community-based sample of romantic partners. Second, from a dyadic perspective, we tested longitudinal dyadic cross-partner effects, focusing on reciprocity and interpersonal dynamics at hand to examine bidirectional relationship processes between partners.

[3] A similar version of this chapter is currently being prepared for publication (Martin, Hill, & Allemand).

Romantic attachment can be defined as a dispositional tendency that shapes interpersonal cognition, emotion, and behaviors such as coping processes and affect regulation strategies in romantic partnership (Hazan & Shaver, 1994; Lopez & Brennan, 2000; Mikulincer, Shaver, & Pereg, 2003). Attachment orientations are a function of an individual's unique experiences with attachment figures in close social relationships including family and romantic relationships (Bowlby, 1969; Cassidy, Jones, & Shaver, 2013).

Attachment anxiety and attachment avoidance represent two relatively orthogonal dimensions of adult attachment orientations (Brennan, Clark, & Shaver, 1998; Fraley et al., 2015). First, attachment anxiety reflects the tendency to fear rejection, and to anxiously worry and ruminate about close relationships. Individuals with higher levels of attachment anxiety are in constant need of the reassurance of their partner's affection and love while fearing abandonment and disloyalty. Second, attachment avoidance, in contrast, refers to the discomfort in situations of emotional closeness. Individuals with higher levels of attachment avoidance tend to dislike and avoid emotional intimacy, and attempt to maximize distance from attachment figures such as the romantic partner. Importantly, attachment plays a primary role when stressors such as conflict or transgressive events are encountered in romantic relationships (Campbell, Simpson, Boldry, & Kashy, 2005; Domingue & Mollen, 2009; Feeney, 2005).

Dispositional forgiveness can be defined as a dispositional tendency to forgive others including the partner (Allemand & Steiner, 2012; Brown, 2003; Hill, Allemand, & Heffernan, 2013). Dispositional forgiveness is associated with many individual attributes that are adaptive for relational functioning. For example, it is positively related to agreeableness and other personality variables describing prosocial tendencies, such as empathic concern and perspective taking (Fehr, Gelfand, & Nag, 2010). Dispositional forgiveness seems to be

linked to relevant relational factors such as emotional intimacy, closeness, and relational commitment (Fincham & Beach, 2002), and thus might be beneficial for romantic relationships in many ways. Dispositional forgiveness appears to be related to constructive communication (Fincham & Beach, 2002), pro-relationship motivation and behavior (Karremans & Van Lange, 2004), and better conflict resolution (Fincham, Beach, & Davila, 2004). Dispositional forgiveness can function as a resource to restore a relationship towards harmony and trust (Fingerman & Charles, 2010; Paleari & Fincham, 2015). However, whether dispositional forgiveness is an adaptive process strongly depends on contextual factors such as relationship quality, severity or frequency of transgressions in a relationship (Martens, 2013; McNulty, 2010).

The association between attachment and dispositional forgiveness has gained increased attention in recent years (Hill et al., 2013). Previous correlational and experimental work provides evidence for attachment-forgiveness associations (Kachadourian et al., 2004; Lawler-Row, Hyatt-Edwards, Wuensch, & Karremans, 2011). Additionally, multiple cross-sectional studies have investigated the association between attachment and dispositional forgiveness in samples of dating and married couples (e.g., Kachadourian et al., 2004; Webb, Call, Chickering, Colburn, & Heisler, 2006). The results of these studies suggest that both attachment anxiety and attachment avoidance are negatively correlated with dispositional forgiveness in the individual. Studies further suggest that the associations between the two attachment orientations (anxiety and avoidance) and dispositional forgiveness are partially mediated by different processes. Increased rumination is assumed to explain the association between higher levels of attachment anxiety and lower dispositional forgiveness while lower empathy is assumed to account for the association between higher attachment avoidance and lower dispositional forgiveness (Burnette et al. 2009; Burnette, Taylor, Worthington, &

Forsyth, 2007; Chung, 2014). Both attachment anxiety and attachment avoidance predict less benign attributions about negative partner behavior, which then relates to lower dispositional forgiveness (Kimmes & Durtschi, 2016).

From an individual perspective, avoidant individuals might be less forgiving with their romantic partner in order to maintain emotional independence from their partners (Mikulincer & Shaver, 2005). Dispositional forgiveness, per definition, is the tendency to engage with – and not avoid – the perceived transgression and the transgressor. Accordingly, individuals with an avoidant attachment tend to be less able to detach from their defensive psychological habit of avoidance and disengagement that would be necessary to engage in the process of forgiving one's partner (Mikulincer & Shaver, 2005, Kimmes & Durtschi, 2016). Likewise, highly anxious individuals might be less forgiving with their romantic partner across situations due to intense negative emotional responses they exhibit as a reaction towards transgressions such as dysfunctional anger, despair, and sadness (Mikulincer & Shaver, 2005). These intensive emotions combined with ruminative tendencies then foster intense and prolonged bouts of anger towards a relationship partner when faced with a transgression, which opposes to processes of giving up resentment in order to forgive (Mikulincer et al., 2006).

Attachment orientations should not only shape post-transgression responses such as forgiveness within individuals (cf. Van Monsjou et al., 2015) but also the interplay between one partner's attachment and the other partner's dispositional forgiveness within and across time. From a dyadic perspective, however, it is largely unclear whether and how romantic attachment is systematically related with dispositional forgiveness at the dyadic level in adult couples. With regard to attachment insecurities, attachment avoidance in one partner should relate to lower levels of dispositional forgiveness in the other across time. Multiple studies

evidenced that attachment avoidance drives self-and partner-reactions when faced with relational tension and stressors (Collins & Feeney, 2004; Gottman & Silver, 1994; Kane, Jaremka, Guichard, Collins, & Feeney, 2007). The habitual tendency to remain emotionally distant from one's partner in avoidant individuals should in turn make it more difficult for their partners to be forgiving of transgressions from their avoidant partners (Pistole, 1989).

However, it is less clear how attachment anxiety might be linked with dispositional forgiveness at the dyadic level longitudinally. High levels of dispositional forgiveness in one partner might be linked to lower levels of attachment anxiety in the other partner, as a forgiving attitude in one partner should counteract the constant fear of being rejected or let down (Mikulincer & Shaver, 2005). Having a forgiving partner should regularly disconfirm anxious individuals fear of being abandoned from their loved one in case of less than perfect behavior and in turn, help to build up more secure attachment orientations across time guided by the assumption, that one's partner will be responsive and caring despite current relational conflict. In that sense, high levels of dispositional forgiveness in one partner may help the other partner to gain more secure attachment orientations, typically referred to as earned security (cf. Paley, Cox, Burchinal, & Payne, 1999; Waters & Waters, 2006).

This study examined cross-sectional and longitudinal associations between attachment orientations and dispositional forgiveness in romantic relationships using a two-wave dyadic longitudinal design with a one-year time interval. We had three primary research goals. First, we cross-sectionally tested the associations between attachment orientations and dispositional forgiveness to replicate previous research. Based on the literature cited above, we expected negative correlations between the two dimensions of attachment and dispositional forgiveness. Second, we examined cross-lagged effects and correlated changes between dispositional forgiveness, attachment avoidance, and attachment anxiety to address the

question of whether there is commonality in change across variables (Hertzog & Nesselroade, 2003). We hypothesized that increases in dispositional forgiveness are accompanied by decreases in both dimensions of attachment while increases in attachment anxiety or attachment avoidance should be accompanied by decreases in dispositional forgiveness. Third, we examined the associations between attachment avoidance and attachment anxiety and dispositional forgiveness on a dyadic level in two steps. In a first step, we examined cross-sectional dyadic associations between attachment and dispositional forgiveness. In a second step, in order to address dyadic associations within and between the constructs in couples over time, we used the longitudinal actor-partner interdependence model (APIM, Cook & Kenny, 2005). We expected that high levels of avoidance in one partner would predict lower levels of dispositional forgiveness is the other partner across time. We hypothesized that high levels of dispositional forgiveness in one partner would predict lower levels of attachment anxiety in the other partner one year later.

3.2. Methods

Participants and Procedure

Participants come from the Swiss longitudinal study "Co-Development in Personality: Longitudinal Approaches to Personality Development in Dyads across the Life Span" (CoDiP; see Schaffhuser, Allemand, & Martin, 2014 for details). Data was drawn from the second and the third measurement occasion, as the measures of interest for this study were not included at the first measurement occasion. For the sake of simplicity, from here on the second measurement occasion is denoted as T1 and the third measurement occasion as T2. The time lag between the two measurement occasions was one year. Because this study focused on romantic relationships, we selected those participants who were in a dating, married or cohabiting relationship at T1, resulting in 514 participants at T1 and 417 at T2 (for

the individual analyses). The romantic partner for 49.8% of participants also participated in the study (N = 148 couples for the dyadic analysis). Participants ranged in age from 18 to 89 years at T1 (M = 47.4, SD = 20.32) with 56.4% being women, and 55.3% of the individuals were married. The average relationship duration was 25.78 years (SD = 17.58).

Attrition analyses revealed that those individuals participating at both measurement occasions did not differ significantly from those dropping-out of the study with respect to dispositional forgiveness, attachment anxiety and attachment avoidance (Cohen's $d < 0.1$ for all three constructs).

Measures

Romantic partner dispositional forgiveness. The Tendency to Forgive Scale (TTF; Brown, 2003) was adapted to assess dispositional forgiveness with respect to the romantic partner. Example items are "I tend to get over it quickly when *my partner* hurts my feelings" and "When *my partner* wrongs me, my approach is just to forgive and forget". Participants rated each of the four items on a 7-point Likert-type scale from 1 (*strongly disagree*) to 7 (*strongly agree*) with regard to their current romantic partner. Higher scores on the TTF indicate a greater tendency to forgive. The alpha reliability estimates for the TTF were 0.74 (T1) and 0.79 (T2).

Romantic partner attachment representation. The nine-item romantic-partner subscale of the Experiences in Close Relationships-Relationship Structures questionnaire (ECR-RS; Fraley, Heffernan, Vicary, & Brumbaugh., 2011) was used to assess individual differences in attachment orientation towards a romantic partner. Participants rated each of the four items on a 7-point Likert-type scale from 1 (*strongly disagree*) to 7 (*strongly agree*) with regard to their current romantic partner. First, *attachment anxiety* addresses issues of being rejected or neglected by one's partner and is captured with three items. An example

item is “I often worry that my partner doesn’t really care for me”. High scores indicate anxiety about being abandoned and rejected by their romantic partner. Second, *attachment avoidance* concerns the comfort with emotional intimacy with one’s partner. High scorers are individuals who are uncomfortable with closeness and dependency towards their partner. An example item is “It helps to turn to my partner in times of need”.[4] The alpha reliability estimates for the attachment avoidance were 0.73 (T1) and 0.80 (T2) and for the attachment anxiety were 0.71 (T1) and 0.70 (T2).

Analytic Strategy

Longitudinal measurement models. We first established a longitudinal measurement model with three interrelated latent variables per measurement occasion (i.e., dispositional forgiveness, attachment anxiety and attachment avoidance). Dispositional forgiveness was measured with four manifest indicators at T1 and T2. Attachment anxiety was measured with three manifest indicators, whereas attachment avoidance was measured with five manifest indicators at both measurement occasions. Preliminary analyses suggested a large residual covariance between the first two items of the attachment avoidance scale at both measurement occasions, reflecting the fact that both items measure the verbal aspect of avoidant behavior. We thus freely estimated this residual covariance at both measurement occasions. Moreover, we allowed for correlated residual variances for the matching items at T1 and T2 (Marsh & Hau, 1996).

Next, we tested whether the measure behaved equivalently over time. Establishing longitudinal measurement invariance (MI) is an essential measurement prerequisite for the

[4] We excluded one item assessing attachment anxiety that showed short-comings in item functioning. This shortcoming in item quality occurred most likely due to improper translation of this specific item. Factor analysis revealed severe cross-loadings on both attachment domains. However, psychometric qualities of the remaining set of items in terms of factor structure and reliability were fully acceptable and comparable to the original instrument by Fraley et al. (2011).

study of constructs over time (Widaman, Ferrer, & Conger, 2010). Testing for longitudinal MI includes fitting confirmatory factor analysis models with increasing restrictions on measurement parameters over time. We first tested an unconstrained measurement model of configural invariance (M1). Second, we tested a model of weak MI with equal factor loadings over time (M2). Finally, we tested a model of strong MI with equal factor loadings and equal intercepts over time (M3; see Widaman et al., 2010 for details).

Previous research has demonstrated effects of relationship duration on attachment (Hadden, Smith, & Webster, 2014), as well as age differences and age-related changes in dispositional forgiveness (Steiner, Allemand, & McCullough, 2012). Thus, we tested for effects of age of participants and relationship duration in both the individual and dyadic models.

Multivariate individual longitudinal models. First, to examine cross-sectional and longitudinal associations between the constructs, we estimated a multivariate autoregressive cross-lagged model (M4; Bollen & Curran, 2006) (see the first model in Figure 1). In order to build the autoregressive cross-lagged model, all of the cross-time associations were specified as regression paths. Second, to examine the correlations between the initial levels and change levels within and between the constructs, we modeled interindividual differences in intraindividual change in attachment and dispositional forgiveness using latent change models (see the second model in Figure 1). Latent change models involve a re-parameterization of the structural part of the longitudinal factor model. In latent change models, the level of a latent construct and the change of this latent construct are estimated (Ferrer & McArdle, 2010; McArdle, 2009). We estimated a multivariate latent change model (M5) simultaneously for the constructs that allowed investigation of correlations at the initial level and between the change factors (correlated change).

Multivariate dyadic longitudinal model. To examine interpersonal associations between attachment and dispositional forgiveness in couples, we conducted a longitudinal actor-partner interdependence model (APIM, Cook & Kenny, 2005) using the subsample of identifiable dyads (49.8 %, i.e., 148 couples) (see the third model in Figure 1). As such, we applied a dyadic longitudinal cross-lagged model that included all three variables at once (M6). Using this model, we estimated stability coefficients for avoidance, anxiety, and dispositional forgiveness and the cross-lagged effects across constructs (actor effects), and the interpersonal effects within the same and across constructs in romantic partners (partner effects). For the dyadic model, we used the mean-scores of the dispositional forgiveness and attachment scales as manifest variables. First, we established a saturated model with all possible regression paths being estimated with control variables accounting for the effect of age and relationship duration (Table 3). Second, we tested whether the regression coefficients were equal between intimate partners (i.e., women and men). For that purpose, we conducted a model comparison based on AIC and BIC (Little, 2013) between a constrained model (with equal regression coefficients for men and women) and a model with freely estimated coefficients across genders (Table 3). The model comparison based on AIC and BIC strongly favored the constrained model, and thus we report these coefficients below. Thus, these represent cross-sectional and longitudinal associations between dispositional forgiveness and attachment in romantic partners on a dyadic level, independently from gender effects.

All analyses were performed with Mplus 7.31 (Muthén & Muthén, 1998-2015). Accounting for the presence of missing data by the full information maximum likelihood (FIML) algorithm for the individual analyses. Dyadic level analyses were based on ML-estimation. For the individual level analyses, we used the Mplus TYPE=COMPLEX procedure and the maximum likelihood estimation with robust standard errors (MLR) to deal

with the complex nature of the data due to dyadic dependency of the data (M1 to M5). This command produces standard errors and an adjusted chi-square test of model fit (adj. χ^2) taking into account non-independence of observations due to cluster sampling of dyads (Muthén & Muthén, 1998-2015). To assess the fit of the models, we examined the adjusted chi-square (adj. χ^2), comparative fit index (CFI), and root-mean square error of approximation (RMSEA) statistics, including the 90% confidence intervals. In general, CFI values above .90 and RMSEA values below .08 are typically considered to indicate that a model is adequately parameterized and reflect an acceptable model fit (Hu & Bentler, 1998; Little, 2013). Model comparisons were performed using the Satorra-Bentler scaled chi-square difference test (TRd), as the chi-square value for MLR cannot be used for chi-square difference testing in the regular way (Muthén & Satorra, 1995; Satorra & Bentler, 2010). The procedure resembles the standard practice of chi-square difference testing (Bryant & Satorra, 2012), except of testing the scaled difference in ML chi-square values for models M1 and M0 after properly recovering *c* (correction factor) for each model. Because chi-square tests become overly sensitive with increasing sample size and a large number of degrees of freedom (Asparouhov & Muthén, 2010), we mainly relied on two alternative methods to evaluate the model fit. First, the RMSEA 90% confidence interval provides an effective method of assessing the relative fit of nested models. Second, a change in CFI of less than .01 amounts to a trivial difference in model fit (Cheung & Rensvold, 2002).

3.3. Results

Preliminary Analyses

Table 1 presents descriptive statistics and zero-order correlations among the study variables for T1 and T2. We established longitudinal measurement invariance (MI) of the measures of dispositional forgiveness and attachment to ensure that the constructs are

comparable across the two measurement occasions. As can be seen from Table 2, based on RMSEA 90% confidence intervals and CFI, the results indicated that the measures behaved equivalently across the two measurement occasions.

Table 1. *Descriptive Statistics and Correlations*

	1.	2.	3.	4.	5.	6.
1. Age	-	-	-	.12*	-.09	.11*
2. Gender	.16**	-	-	.24*	.07	-.04
3. Relationship duration	.81**	.07	-	.08	.08	-.10*
4. Dispositional forgiveness	.20**	.23**	.22*	-	-.14**	-.28**
5. Avoidance	-.06	.06	.07	-.04	-	.39**
6. Anxiety	.13**	-.05	-.09*	-.15**	.40**	-
M T1	47.4	-	19.9	4.02	2.15	2.10
SD T1	20.3	-	17.58	1.23	1.20	.93
M T2	-	-	-	4.34	2.00	2.02
SD T2	-	-	-	1.24	1.12	.95

Note. N = 514; correlations at T1 are reported below the diagonal, correlations at T2 are reported above the diagonal; gender: 1 = male, 2 = female; relationship duration in years.

*$p < .05$, **$p < .01$.

Multivariate Individual Analyses

Based on the model of strong MI (M3), we then examined cross-sectional and longitudinal associations using the autoregressive cross-lagged model (M4). This model had a good fit to the data (Table 2). Initial level correlations indicated a positive association between the two attachment dimensions at baseline measurement (Table 4) ($r = .43$, $p < .001$). Attachment anxiety was negatively correlated with dispositional forgiveness at baseline ($r = -.15$, $p < .05$), while attachment avoidance was not significantly correlated with

dispositional forgiveness (r = .003, p = .97). We found cross-lagged associations between the two attachment dimensions (Table 4). Specifically, higher levels of attachment anxiety at T1 predicted higher levels of attachment avoidance at T2. Higher levels of attachment avoidance at T1 predicted higher levels of attachment anxiety at T2. With regard to cross-domain associations of attachment and dispositional forgiveness over time, we found that higher levels of dispositional forgiveness at T1 predicted lower levels of attachment anxiety at T2. Analyses did not reveal any significant cross-lagged effects between attachment avoidance and dispositional forgiveness (see Table 4 for complete results of the longitudinal analyses).

Based on the model of strong MI (M3), we then examined mean level change and individual differences in change of the constructs using a multivariate latent change model (M5). This model also evinced a good fit (Table 2). Analyses did not indicate significant mean level change for the three constructs of interest, but did show significant change variances for all three (Table 4). In other words, though mean-level trends did not occur on a between-person level, we found interindividual differences in intraindividual change. With respect to correlated changes between constructs, change in dispositional forgiveness was negatively correlated with changes in both dimensions of attachment while changes in avoidance and anxiety were positively correlated.

Table 2. *Longitudinal Measurement Invariance and Model Fits of Individual Analyses*

Model	Type	Adj. χ^2 (df)	CFI	RMSEA (90% CI)	$\Delta\chi^2$ TRd (Δdf)	Δ Models
M1	Longitudinal measurement model	425.629 (223)	.942	.042 [.036 – .048]		
M2	Longitudinal measurement model (weak)	429.286 (232)	.943	.041 [.035 – .047]	5.073 (9)	M1 - M2
M3	Longitudinal measurement model (strong)	473.465 (244)	.934	.043 [.037 – .049]	49.193 (12)**	M2 - M3
M4	Multivariate autoregressive cross-lagged model [a, b, c]	616.262 (298)	.915	.046 [.040 – .051]		
M5	Multivariate latent change model [a, b, c]	614.238 (295)	.915	.046 [.041 – .051]		

Note. *N* = 514 individuals*;* M1 = unconstrained multivariate measurement model; M2 = M1 plus equal factor loadings; M3 = M2 plus equal factor intercepts; [a]=controlling for age; [b]= controlling for gender; [c]= controlling for relationship duration; Adj. χ^2 (df) = adjusted chi square difference; CFI = comparative fit index; RMSEA = root mean squared of approximation; 90% CI = 90% confidence intervals for RMSEA; $\Delta\chi^2$ TRd = Satorra-Bentler scaled chi square difference; Δdf = difference in degrees of freedom; Δ Models = comparison of models.

Table 3. *Model Fits of Dyadic Analyses*

Model	Type	AIC	BIC	CFI	RMSEA (90% CI)	Δ Models
M6	Multivariate APIM [c]	6120.53	6432.24	1.00	.00 [.00 - .00]	
M7	Multivariate APIM [c]	6091.65	6295.46	0.98	.04 [.00 - .07]	M6 – M7

Note. *N* = 148 dyads. M6 = Unconstrained model; M7 = all correlation and regression coefficients are constrained to be equal for men and women. AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; CFI = comparative fit index; RMSEA = root mean squared of approximation; 90% CI = 90% confidence intervals for RMSEA; Δ Models =comparison of models.

Table 4. *Results from the Multivariate Longitudinal Analyses (M4 – M5)*

	Rank-order stability and Cross-lagged Effects (95% CI) *(B)*	Mean-level change (95% CI) ΔM *(B)*	Change variance ΔVar	Correlated change (95% CI) *(r)*
Avoidance	0.66** [0.52 – 0.79]	-0.04 [-0.46 – 0.39]	0.86** [0.74 – 0.99]	
Anxiety	0.14* [0.05 – 0.28]			
Dispositional forgiveness	-0.02 [-0.12 – 0.08]			-0.26* [-0.42 – -0.09]
Anxiety	0.50** [0.34 – 0.66]	-0.22 [-0.60 – 0.17]	0.69** [0.52 – 0.85]	
Avoidance	0.18** [0.04 – 0.33]			0.22* [0.08 – 0.36]
Dispositional forgiveness	-0.16** [-0.26 - -0.05]			-0.18† [-0.37 – 0.01]
Dispositional forgiveness	0.75** [0.67 – 0.85]	0.06 [-0.45 – 0.57]	0.87** [0.75 – 0.98]	
Avoidance	-0.03 [-0.14 – 0.09]			
Anxiety	-0.11 [-0.26 – 0.04]			

Note. N = 514. For the three columns displaying results on rank-order stability, cross-lagged effects, mean-level change and change variance, the indented variable names mark the Outcomes at T2. Coefficients of correlated change in the last column refer to change scores between T1 and T2.

†p = .06, *p < .05, **p < .01.

Table 5. *Results from the Multivariate Dyadic Analyses (M7)*

T2 Outcome	T1 Predictor	Actor Effects *(B)* (95% CI)	Partner Effects *(B)* (95% CI)
Forgiveness	Forgiveness	0.64** [0.55 – 0.73]	-0.04 [-0.15 – 0.06]
	Anxiety	- 0.09 [-0.20 – 0.03]	0.04 [-0.06 – 0.15]
	Avoidance	0.01 [-0.10 – 0.12]	-0.15* [-.26 – -0.06]
Anxiety	Anxiety	0.28**[0.15 – 0.41]	0.05 [-0.08 – 0.17]
	Avoidance	0.19* [0.06 – 0.33]	0.06 [-0.08 – 0.19]
	Forgiveness	-0.22** [-0.33 – -0.11]	0.01 [-0.12 – 0.13]
Avoidance	Avoidance	0.69** [0.60 – 0.78]	0.07 [-0.03 – 0.16]
	Forgiveness	- 0.06 [-0.14 – 0.03]	-0.06 [-0.14 – 0-03]
	Anxiety	0.09 [-0.01 – 0.20]	0.02 [-0.08 – 0.11]

Note. N =148 couples; Actor effects indicates how a person's current behavior is predicted by his or her own past behavior; partner effects indicate how a person's current behavior is predicted by his or her partners' past behavior.

*p <.05, **p <.01

Multivariate Dyadic Analyses

Dyadic associations at T1 indicated that higher levels of avoidance in one partner were related to higher levels of avoidance in the other (r = .43, p < .001), that higher levels of anxiety in one partner were related to higher levels of anxiety in the other partner (r = .20, p < .05), and that higher levels of dispositional forgiveness in one partner were related to higher levels of dispositional forgiveness in the other partner (r = .16, p < .05). We found that higher levels of avoidance in one partner were related to higher levels of anxiety in the other partner (r = .27, p < .001). Higher levels of dispositional forgiveness in one partner were correlated with lower levels of anxiety (r = -.13, p < .05) and avoidance (r = -.13, p < .05) in his or her partner. For the longitudinal dyadic associations, only one partner effect was statistically significant: avoidance at T1 in one partner predicted the level of dispositional forgiveness in the other partner at T2. For complete results of the longitudinal analyses see Table 5.

3.4. Discussion

This study examined longitudinal associations between attachment and dispositional forgiveness in romantic partners from individual and dyadic perspectives. Three main findings emerged. First, in line with previous research, initial levels of dispositional forgiveness and attachment anxiety were negatively correlated cross-sectionally. Second, we demonstrated cross-lagged effects and correlated change between the two dimensions of attachment and dispositional forgiveness. Third, dyadic analyses revealed associations of the three constructs between partners at the initial level. In addition, partner avoidance longitudinally predicted dispositional forgiveness over time.

Individual Perspectives on Attachment and Dispositional Forgiveness

In line with previous cross-sectional research, we found that attachment anxiety was negatively correlated with dispositional forgiveness. However, attachment avoidance and

dispositional forgiveness were not significantly related at baseline. While previous studies demonstrated cross-sectional associations between attachment and dispositional forgiveness across different measurement and modeling techniques (Burnette et al., 2007, 2009; Kachadourian et al., 2004), the current findings demonstrate that the associations between romantic attachment and dispositional forgiveness also hold longitudinally. However, attachment avoidance did not predict romantic dispositional forgiveness across time. Results suggest that at the individual level, attachment anxiety relates to lowered dispositional forgiveness within and across time. Anxious attachment and the fear of being rejected by the partner should drive skewed perception and pessimistic appraisal and attribution of partner transgressions. Across time, these attributions followed by intense negative affect in those with elevated attachments anxiety should impede dispositional forgiveness with respect to partner transgressions.

We found that those intraindividual changes in dispositional forgiveness and attachment are interrelated. To our knowledge, this study is the first to demonstrate evidence for correlated change between attachment and dispositional forgiveness. Correlated change in dispositional forgiveness and attachment may have different reasons. First, commonality in change in attachment and dispositional forgiveness may be caused by specific and discrete events. For example, experiencing an unexpected, hurtful event with an intimate partner may lead to an increase in anxious attachment and at the meantime decrease this person's overall dispositional forgiveness towards his or her romantic partner. Positive and negative life events, role transitions or daily experiences of positive valence or may affect coupled change (Davila & Sargent, 2003; Scharfe & Cole, 2006). Second, correlated change at the trait level may be also linked to continuous processes at a state level, such as adjustment to one's partner and the relationship across time, which then affects one's own attachment and

dispositional forgiveness at a trait-level. For example, anxiety across time may decrease in an individual and thus, the more that individual is able to see and use his or her partner as a *secure base* and *safe haven*, this also eases his or her overall tendency to be forgiving with that partner.

Dyadic Perspectives on Attachment and Dispositional Forgiveness

Consistent with the individual cross-sectional analyses, we found that initial levels of dispositional forgiveness and attachment anxiety were negatively correlated not only within individuals, but also within couples. Being highly forgiving is associated to having a partner, who is low in avoidance and anxiety and vice versa at a cross-sectional level. Longitudinally, we found that one partner's avoidance predicted the other partner's level of romantic dispositional forgiveness one year later. These results may indicate that feeling and behaving emotionally distant from one's romantic partner (which is characteristic for those individuals high in avoidance) may negatively affect their partners' willingness to forgive transgressions committed by the avoidant partner. Behavioral correlates of attachment avoidance such as withdrawal, physical and psychological distancing and escape after relationship conflict may account for the longitudinal partner effect of high avoidance predicting lower levels of dispositional forgiveness in one's partner. Higher levels of attachment avoidance may also have negative effects on important relationships variables such as trust, empathy, perspective taking, emotional intimacy or self-disclosure that play an important role in the context of forgiveness (Mikulincer & Shaver, 2005). Individuals may perceive their avoidant partner as less emotionally close or committed, which may in turn lead to a less forgiving attitude towards that specific partner.

Across situations and independently from one's own attachment anxiety or attachment avoidance, it might be easier to be forgiving with a partner who is empathetic and

comfortable with emotional closeness. These assumptions are line with results from a daily diary study of married couples on daily fluctuation in the tendency to forgive one's spouse (Mikulincer et al., 2006). In that study, higher rates of pro-relationship behaviors (e.g., being available, attentive or supportive) in spouse A were significantly associated with higher levels of forgiveness of the spouse B towards spouse A. However, the hypothesis of high levels of dispositional forgiveness in one partner predict lowered levels of attachment anxiety in the other partner one year later could not be confirmed.

Future research should work on unraveling and disentangling the differences between the associations of dispositional forgiveness and attachment on an individual in contrast to a dyadic level. In this study, the patterns of results were not uniform across individual and dyadic perspectives. Results suggest that the two attachment dimensions and their link to dispositional forgiveness take on non-identical forms in the individual than they do between romantic partners. Potentially, high levels of attachment anxiety, the expression of attachment needs and vulnerabilities center one's own attention on the self, may have stronger implications for the intrapersonal context, thus accounting for the association between anxiety and dispositional forgiveness at the individual level. Attachment avoidance, which leads to directing one's own attention and vigilance away from the self, may be more strongly associated with dispositional forgiveness at the dyadic level. Though speculative, these ideas provide further support that the two attachment dimensions hold differential interpersonal functions (see Martens, 2013; Fraley & Shaver, 2000).

Limitations and Conclusions

Both attachment and dispositional forgiveness are assessed by self-report measures. As such, conclusions can only be drawn about individuals' explicit, conscious and self-perceived attachment representation and dispositional forgiveness towards their romantic partner.

Further, this study is correlational in nature. Future studies examining the link between attachment and dispositional forgiveness should use multiple methods and quasi-experimental designs to allow for empirical based inferences about the causal structure among the variables. Finally, attachment and dispositional forgiveness were assessed only two times. Therefore, future studies should address the question whether changes represent a lasting reorganization of attachment and dispositional forgiveness (long-term development) or rather temporal fluctuations (short-term variation).

These caveats aside, the present study significantly extends prior research on the associations between attachment and dispositional forgiveness by examining these relations longitudinally over a one-year period in a community-based sample of romantic partners. Additionally, by addressing and comparing individual and dyadic perspectives on dispositional forgiveness and attachment, we were able to show how associations differ at the individual versus dyadic level. The associations between attachment and dispositional forgiveness are complex, and individual and dyadic associations between attachment and dispositional forgiveness do not always parallel each other. In sum, the current findings provide support for longitudinal associations between attachment and dispositional forgiveness both on an individual and dyadic level, taking on different forms in the person and in couples across time.

4. Study 2: Attachment Security and Forgiveness in Daily Life

Attachment Predicts Transgression Frequency and Reactions in Romantic Couples' Daily Life [5]

4.1. Introduction

At times, everyone feels hurt by his or her romantic partner. However, some individuals feel hurt much more often than others; moreover, individuals differ in their responses to reported transgressions by their partners. Attachment orientations to romantic partners, or the generalized expectations and evaluations people hold about their relationships, may play an important role for acknowledgement of and reactions to relational transgressions in romantic relationships, as attachment orientations are relevant predictors of interpersonal perceptions, appraisals and functioning in social interactions (Kafetsios & Nezlek, 2002; Sheinbaum et al., 2015). In the current work, we examined (a) how individual differences in romantic attachment relate to transgressions caused by the partner in everyday life, and (b) how individual differences in romantic attachment orientations relate to reactions after experiencing a transgression. This study examined the role of individual differences in two attachment orientations for experiences of partner transgressions and how attachment orientations are associated with different reactions to these transgressions.

Individual differences in attachment orientations can be conceptualized along the dimensions of attachment anxiety and attachment avoidance (Brennan, Clark, & Shaver, 1998; Fraley, Heffernan, Vicary, & Brumbaugh, 2011; Fraley, Hudson, Heffernan, & Segal,

[5] A similar version of this chapter is in revision at "Personal and Social Relationships" (Martin, Hill, & Allemand).

2015). Secure attachment orientations are marked by the relative absence of anxiety and avoidance. Secure attachment orientations correspond with optimistic views of relationships, positive beliefs about other's goodwill, greater relationship satisfaction and adjustment, and generally positive views of themselves and their romantic partners (Cassidy, 2000 for a review; Griffin & Bartholomew, 1994). Attachment anxiety is characterized by an extreme desire for closeness combined with the tendency to fear rejection and abandonment by one's partner, leading to increased vigilance to threat-related cues in close relationships. Highly anxious individuals tend to experience more intense negative emotions and more variable "highs and lows" within their relationships than those low in anxiety (Cooper, Totenhagen, McDaniel, & Curran, 2017; Collins & Read, 1990).

In contrast, attachment avoidance refers to the discomfort that an individual feels in situations of emotional closeness. Individuals with higher levels of attachment avoidance tend to dislike and avoid emotional intimacy (Cassidy, 2000; Shaver & Mikulincer, 2003). In contrast to higher levels of attachment anxiety, individuals higher in avoidance tend to engage in defensive processes to suppress emotional reactions and engagement with relationship partners to avoid further frustration (Cassidy & Kobak, 1988; Mikulincer & Orbach, 2005; Mikulincer, Shaver, & Pereg, 2003; Winterheld, 2016). The fact that individuals with anxious and avoidant attachment orientations tend to show differential perceptions and reactions in interpersonal stressful situations makes attachment orientations an important concept for consideration in the context of partner transgressions and finally, dyadic forgiveness.

Attachment and Perceived Transgression Frequency

Attachment orientations play a primary role in interpersonal stress situations, including conflicts and disagreements in romantic relationships (Campbell, Simpson, Boldry, & Kashy,

2005). Given the wide range of research on perceptions of conflict as a function of attachment orientations in romantic relationships, there is a strong reason to assume that attachment orientations similarly account for the perception of partner transgressions (Feeney & Karantzas, 2017). The defining aspect of a relational transgression is the emotional experience of hurt and/or angry feelings in the individual due to a specific relational event (Feeney, 2005; Vangelisti, 2009). This inner emotional state may or may not be disclosed to one's partner, and hence may or may not involve disagreement, making it distinguishable from relational conflict (Feeney & Karantzas, 2017). Compared with conflict and disagreement, transgressions may reflect subtler or less salient forms of relationship disruptions. However, due to the perception of relational devaluation that is at the basis of hurt feelings, the consequences of relational transgressions can be profound for relationship functioning and stability (Fincham, 2000; Shaver, Mikulincer, Lavy, & Cassidy, 2009).

In gaining deepened understanding of the factors driving forgiveness within romantic relationships, it is crucial to initially identify factors guiding the perception of relational transgressions within romantic partners, which then in turn may give reason to forgive. Indeed, previous empirical evidence demonstrates that attachment anxiety is associated with heightened detection of relational threats, while in contrast, attachment avoidance is predictive for the dismissal of threatening events (Ein-Dor, Mikulincer, & Shaver, 2011, Sheinbaum et al., 2015). Individual differences in attachment orientations are systematically related to how individuals attribute partner behaviors (Domingue & Mollen, 2009; Pietromonaco & Feldman Barrett, 1997). The way individuals appraise ambiguous relational events determines whether they perceive these events as relational transgressions from their partners (Collins, Ford, Guichard, & Allard, 2006; Vangelisti, Young, Carpenter-Theune, & Alexander, 2005). For example, an individual with a relatively secure attachment should be

less inclined to attribute potentially hurtful behaviors of the partner as an intentional act aiming to devalue the relationship.

Hence, attachment orientations may determine a threshold at which individuals judge conflicts or negative events in their relationship as transgressive, which should be differentially related to attachment anxiety and attachment avoidance. Attachment anxiety manifests in exaggerating the presence and seriousness of relationship-threatening events, given the fact that anxious individuals tend to overemphasize their own and their relationship's vulnerability (Mikulincer & Shaver, 2005; Shaver, Mikulincer, Lavy, & Cassidy, 2009). Individuals with greater attachment anxiety show hypersensitivity to relationship threats, signs of rejection or devaluation from their partners, as they are in constant concern to detect relationship threats as congruent to their expectations and beliefs on attachment bonds (Collins et al., 2005; Fraley, Niedenthal, Marks, Brumbaugh, & Vicary, 2006). Hence, individuals with greater attachment anxiety should report more transgressions in their relationships than securely attached individuals would. In contrast, attachment avoidance manifests in the tendency to inhibit acknowledgment of relationship threats. Defensive exclusion during information processing (e.g., perception, encoding, appraisal), memorization and retrieval (Chun, Shaver, Gillath, Mathews, & Jorgensen, 2015; Davis & Schwartz, 1987; Fraley & Brumbaugh, 2007; Fraley, Garner, & Shaver, 2000) leads to higher emotional inhibition and suppression in avoidant individuals. Hence, avoidant individuals tend to be kept from noticing their own attachment-related distress, such as acknowledging transgressions and feelings of hurt. Accordingly, with greater attachment avoidance should report fewer transgressions in their relationships than secure individuals would.

However, feeling hurt is not only a matter of perceiving certain events as hurtful (intrapersonal appraisal), but also a consequence of actual behaviors of one partner inflicted

upon the other (interpersonal interaction; Brassard, Lussier, & Shaver, 2009; Karantzas, Feeney, Gonvalces, & McCabe, 2013). For example, research has shown that individuals with higher attachment insecurities are more likely to display behaviors that could be perceived as transgressive by the other partner such as giving less support and caregiving, less accommodating and compromising behaviors, or dysfunctional and offending expressions of anger (Li & Chan, 2012). Hence, the frequency of perceived transgression may not only vary as a function of one's own attachment orientation due to perception and appraisal (actor effects), but also as a function of one's partner's attachment orientation and interpersonal processes within the couple (partner effects).

Attachment and Reactions to Perceived Transgressions

Individual differences in attachment orientations may also affect how romantic partners respond to transgressions. How people behave when faced with a partner transgression determines whether hurt and conflict in a relationship can be resolved or whether they escalate and lead to deterioration of relational bonds. For example, research has shown that having secure attachment orientations (i.e., low scores in attachment anxiety and attachment avoidance) is associated with higher abilities to cope with relational stressors (Holmberg, Lomore, Takacs, & Price, 2011; Seiffge-Krenke, 2011; Van Monsjou et al., 2015) and more adaptive strategies to resolve relational conflict (Creasey & Hesson-McInnis, 2001; Zhang & Labouvie-Vief, 2004). One adaptive strategy for dealing with interpersonal transgressions is forgiveness. Indeed, recent research has evidenced associations between attachment orientations and forgiveness in both situational (Lawler-Row, Hyatt-Edwards, Wuensch, & Karremans, 2011, Lawler-Row, Younger, Piferi, & Jones, 2006,) and dispositional forms (e.g., Kachadourian, Fincham, & Davila, 2004; Kimmes & Durtschi, 2016, Mikulincer, Shaver, & Slav, 2006).

Forgiving reactions take place on three motivational dimensions (Hoyt, Fincham, McCullough, Maio, & Davila, 2005): avoidance (to avoid both physical and psychological contact with the offender), revenge (to have feelings of righteous indignation and to see harm done to the offender), and benevolence (complaisant and positive feelings and behaviors towards the offender). Taking revenge on one's partner includes any attempt to "even the score" and intentionally harm one's partner as a response to the experienced transgression. Avoidance manifests in withdrawal, escaping and distancing behaviors, and resigning from any kind of behavior that fosters intimacy and closeness. Being and feeling benevolent towards one's partner includes overt sign of goodwill and positive feelings towards one's partner. When people forgive relational transgressions, they become less avoidant, less vengeful, and more benevolent toward their partner who hurt them (Fincham, 2000).

A final important reaction to consider is whether individuals ruminate about a given transgression. Rumination about a transgression can be understood as the opposite of forgiveness. Transgression-related rumination is defined as maladaptive and excessive focus on negative thoughts and feelings about a past transgression and tends to perpetuate and exacerbate psychological pain and anger that the offence has caused (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). Extensive rumination about a transgression has been shown to be obstructive for letting go of negative feelings toward the offender and developing more benevolent feelings (Barber, Maltby, & Macaskill, 2005; Paleari, Regalia, & Fincham, 2005). Like forgiveness, rumination is closely related with attachment. Several studies evidenced that greater attachment anxiety is related to greater ruminative tendencies (Burnette, Davis, Green, Worthington, & Bradfield, 2009; Burnette, Taylor, Worthington, & Forsyth, 2007; Chung, 2014).

Attachment avoidance and anxiety are likely to be associated with these four post-transgression reactions. First, avoidant attachment is defined by a desire to distance oneself in the relationship, and thus should be associated with greater avoidance in the face of a transgression. Further, high levels of attachment avoidance should be related to higher levels of revenge motivation. Revenge is typically associated with hostile attitudes and behaviors towards one's partner, characteristic to those emotional reactions of individuals high in avoidance when confronted with negative relational events (Mikulincer & Shaver, 2005). Higher levels of attachment anxiety and attachment avoidance should be associated with lower levels of benevolence. Benevolence reflects a security-based attachment-strategy, guided by positive assumptions on self and other (Griffin & Bartholomew, 1994). Individuals with greater attachment anxiety should be overwhelmed with intense negative emotions associated with the transgressions, struggling to overcome hurt feelings and replace those with benevolent feelings towards the offender (Campbell et al., 2005; Mikulincer & Shaver, 2005; Overall, Girme, Lemay, & Hammond, 2014). Individuals with greater attachment avoidance should display less goodwill towards one's partner, prioritizing self-reliance and emotional detachment subsequent to transgressive events rather than strengthening benevolent interactions within the partner to restore harmony and closeness (cf. Mikulincer & Shaver, 2005; Winterheld, 2016).

Importantly, even though forgiveness and rumination reflect intrapersonal processes, they take place in a dyadic context. It is not only one's own attachment orientation that manifests in individual's reactions to perceived partner transgressions, but also the couple's dyadic adjustment. Empirical studies evidenced that a person's attachment affects how his or her partner reacts to negative relational events (Feeney, 2005; Nisenbaum & Lopez, 2015). However, to the best of our knowledge, no study yet evidenced these partner effects of

attachment in terms of forgiveness and rumination. Thus, it is important to examine these contributions of each person's attachment orientation to his or her partner's typical reactions to perceived transgressions (partner effects). We assume that irrespective of a person's own attachment insecurity, partner effects of attachment insecurity should affect forgiving reactions and transgression-related rumination. Due to higher relational skills such as emotion regulation, empathy and perspective taking (Chung, 2014; Kimmes & Durtschi, 2016), and their heightened ability to self-disclose (Mikulincer & Nachson, 1991), securely attached individuals should facilitate dispositional forgiveness in their partners via sensitive responsiveness and availability. Likewise, higher levels of attachment avoidance and attachment anxiety in one partner foster negative reciprocity, eventually impeding forgiveness in the other partner (Gottmann, 1994). Both deactivating and hyperactivating strategies in dealing with one's partner's transgression-related distress are self-oriented and not attuned to partner needs. At the dyadic level, both hyperactivating and deactivating strategies are found to foster maladaptive outcomes in one's partner (Mikulincer & Shaver, 2005; Mikulincer et al., 2006). Even though one partner may strive to engage in forgiveness, his or her partner's relatively insecure attachment orientations are assumed to exacerbate these attempts to reestablish closeness and thereby perpetuate hurt and conflicts rather than settle them.

The Present Study

Although the studies reviewed above provide evidence for individual differences in attachment-orientations guiding perceptions and reactions to relational conflict, this association has not yet been evidenced with respect to reactions to transgressions. Hence, in this study, transgressions and reactions were not only assessed at one point in time using self-reports of generalized experiences. Instead participants were asked daily about their

experiences across two weeks. Daily sampling allows for reduced retrospective bias and increased ecological validity, capturing aspects of a couples' authentic life (Bolger, Davis, & Rafaeli, 2003; Reis, 2012). The present study had two objectives. First, we examined how individual differences in romantic attachment orientations relate to frequency of perceived partner transgressions. Second, we examined how individual differences in romantic attachment orientations relate to reactions to transgressions. For both objectives, we examined associations on a dyadic level, as all constructs of interest listed above are dyadic in nature. Relational transgressions and forgiveness in romantic relationships are inherently interpersonal (Fincham, 2000; McCullough et al., 1998) and involve both members of the dyad.

It was a primary goal of the study to rule out that perceived transgression frequency and subsequent reactions to these transgressions can be explained by relational constructs such as relationship satisfaction, relationship duration, or each partners' general tendency to forgive. In order to demonstrate that attachment was related to transgression frequency and reactions above and beyond other relational factors of the couple and the dyad, we examined the link between our constructs of interests after controlling for (a) the couples' relationship duration in order to account for the fact that newly established couples might differ in the examined outcomes from long-term couples, (b) both partners' relationship satisfaction, as previous studies indicate, that relationship satisfaction is closely related to perception of conflict and dealing with negative relational events, with those being highly satisfied reporting less transgressions while showing more effective coping (Brassard et al., 2009, Karantzas, et al., 2013; Totenhagen, Butler, Curran, & Serido, 2016), (c) both partners' dispositional forgiveness in order to evidence that attachment-orientations predict forgiving reactions in relevant situations above and beyond trait-levels of dispositional forgiveness that are reported

without referring to actual events. Finally, we also controlled for the number of diary entries provided for each participants to guarantee that findings of the study are independent from the participants varying levels of compliance.

4.2. Methods

Participants and Procedure

Data from a daily diary study of US-adults over 10 days were used to examine attachment orientations and daily transgressions. Participants were recruited in dyads (friends or romantic partners). For the purpose of this study, we only included heterosexual romantic partners. Out of 178 dyads we therefore excluded 30 dyads of friends, 8 homosexual couples and 1 dyad in which only one partner eventually participated in the end-of-day surveys following the initial survey, resulting in a final sample of 139 dyads (N = 278 individuals). Though we sampled dyads regardless of sexual orientation, only few homosexual couples participated, which prevented analyses in this sample given limited power. The mean age of participants was 46.2 years (SD = 14.4). The mean relationship duration was 18.5 years (SD = 13.6). In the sample, 53.2% held a university degree as highest level of education. Regarding participants' ethnicity, 84.5% of the sample was Caucasian. 2.5% African or African-American, 6.5% Latin or Latin-American, 5.4% Asian or Asian-American and 1.1% indicated "other". In the sample, 73.7% was currently employed, with 9% being full-time students.

Participants were recruited through the survey-based research platform Qualtrics (www.qualtrics.com) in exchange for survey rewards equivalent to $20 for the initial survey and $75 for the daily follow-up per dyad. First, participants completed an initial survey with demographic variables and individual differences measures. Second, participants were asked to complete an end-of-day survey including the assessment of transgressions each day from

Monday to Friday over two weeks. On average, participants provided data in 75.74% of the measurement occasions of the daily diary survey.

Individual Differences Measures

Romantic partner attachment orientations. The romantic-partner subscale of the Experiences in Close Relationships-Relationship Structures questionnaire (ECR-RS; Fraley et al., 2011) was used to assess individual differences in attachment orientations towards a romantic partner at baseline measurement. Respondents answered each of the nine items using a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The scale assesses two dimensions of attachment orientation: Attachment anxiety addresses the issues of being rejected or neglected by one's partner with three items (e.g., "I'm afraid this person may abandon me"). Attachment avoidance assesses the comfort with emotional intimacy with one's partner with six items (e.g., "I don't feel comfortable opening up to this person"). Higher scores correspond to greater anxiety and avoidance, respectively. The alpha reliability estimate for attachment avoidance was .92 and for attachment anxiety was .91.

Daily Diary Measures

Number of perceived partner transgressions. At the end of day, participants were asked "Did your partner hurt or anger you in the past 24 hours?" (*no* = 0, *yes* = 1). The daily occurrences of perceived transgressions were summed up across the 10 days, resulting in a count variable reflecting the total number of transgressions for each individual. Individual counts can range from 0 (indicating no transgressions at all) to 10 (indicating transgressions on every single day).

Reactions to perceived partner transgressions. If participants perceived a partner transgression, they were asked about four typical reactions: revenge, avoidance, benevolence, and rumination. Revenge, avoidance, and benevolence were measured with items from the

work by Hoyt, Fincham, McCullough, Maio, and Davila (2005). Four items were used to measure the avoidant reactions toward the partner (e.g., “I kept my distance for a long time”, “I didn’t want to have anything to do with him/her”). Two items (e.g., “I found a way to make him/her regret it”, “I found a way to even the score”) were used to measure revengeful reactions. Three items were used to measure benevolent reactions toward the partner (e.g., “I didn’t hold it against him/her for long”, “I forgave him/her pretty easily”). The items were rated using a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Two items (“Thoughts and feelings about how he/she hurt me kept running through my head”, “I found it difficult not to think about the hurt that he/she caused me”) were used to assess transgression-related rumination (McCullough, Orsulak, Brandon & Akers, 2007). The items were rated on a 6-point scale ranging from 0 (*never*) to 5 (*extremely often*). Intraindividual means were calculated for all four reactions.

Control Variables

Four variables were used as controls in all models. First, we controlled for the number of diary as an individual-level variable to account for potential individual differences in study compliance. Second, we controlled for relationship duration as a dyad-level variable. Research has shown that attachment orientations are related to relationship duration and that attachment bonds in intimate partners develop with time (e.g., Fraley & Davis, 1997). Third, we aimed to show that attachment orientations are valuable predictors of transgression frequency and reactions to transgressions in daily life in dyads with varying levels of relationship satisfaction. The Relationship Assessment Scale (RAS; Hendrick, Dicke, & Hendrick, 1998) was used to assess individual differences in relationship satisfaction regarding the current romantic relationship at baseline measurement. Respondents answered each item using a 5-point Likert-type scale ranging from 1 (*low*) to 5 (*high*). Hence, the

higher the score, the more satisfied the respondent is with his/her relationship. The alpha reliability estimate was .91.

Fourth, we controlled for dispositional partner forgiveness using the Marital Forgiveness Scale (MFS; Fincham & Beach, 2002) at baseline measurement in order to be able to provide evidence, that attachment orientations predict daily reactions to transgressions above and beyond trait levels of dispositional forgiveness in romantic partners. Participants responded to each item using a 6-point Likert-type scale from 1 (*strongly disagree*) to 6 (*strongly agree*). Higher scores on the MFS are indicative of a greater tendency to be generally forgiving with one's a partner. The alpha reliability estimate was .83. Fourth, we controlled for relationship satisfaction.

Analytic Strategy

We estimated a series of Actor-Partner Interdependence Models (APIMs; Cook & Kenny, 2005). Figure 1 includes an illustration of the APIM. The APIM is an analytical framework to describe interdependent outcomes within dyads while controlling for nonindependence of observations. We estimated APIMs that included the four predictor variables (attachment avoidance and attachment anxiety for males and females) and both outcomes (male and female dependent variable). In the APIM framework we estimated actor effects that represent associations between an individual's attachment orientations and his or her dependent variable, and partner effects that capture the associations between the individual's attachment orientations and the partner-reported dependent variable (cf. Cook & Kenny, 2005, Kenny, Kashy, & Cook, 2006). We controlled for potential effects of the number of diary entry, relationship duration, relationship satisfaction, and dispositional romantic forgiveness. To ensure comparability of the estimates of the predictor and control variables, all variables were standardized before entering into the models.

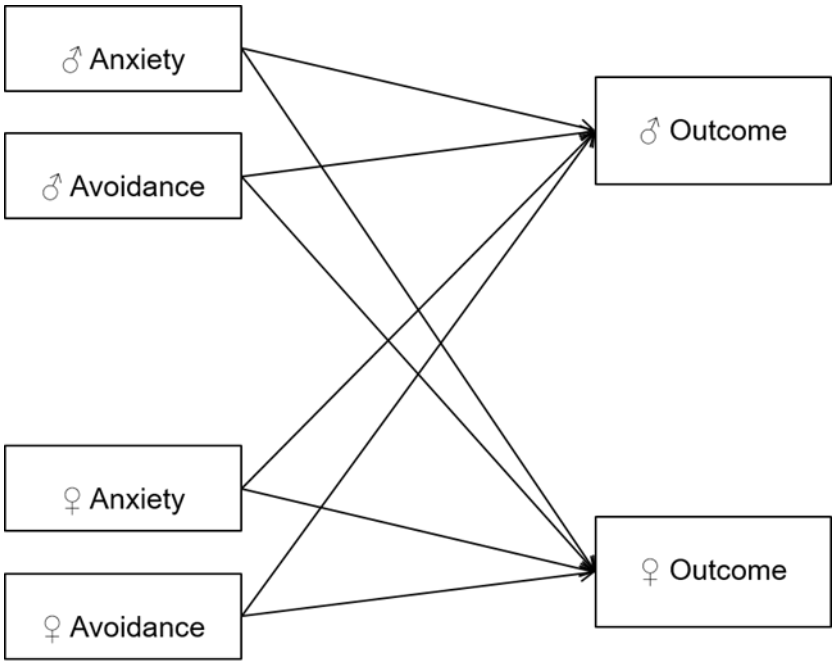

Figure 1.
APIM. ♀ = women; ♂ = men; due to parsimony of the conceptual model and space constraints, only regressive paths of the predictor variables are shown in the model while all correlational paths and control variables are not shown in the model.

The analyses were conducted in two steps. First, we ran a model to test whether attachment predict the number of perceived partner transgressions in daily life. Because the number of perceived partner transgressions is a count variable that had a low arithmetic mean (see Figure 2), OLS-regression analyses will most certainly produce biased results of model estimation (cf. Coxe, West & Aiken, 2009; Hilbe, 2011). Therefore, we used a negative binomial (NB) model to analyze count data. Negative binomial models estimate the log of the expected counts, given the value of the predictor variable. They have maximal statistical power while maintaining the proper Type 1 error rate, when the outcome is a count with a low arithmetic mean. Coefficients in count models represent the difference in the expected

log-count of one level in the predictor variable compared with another in the predictor. To facilitate interpretation, coefficients can be transformed to Rate ratios (RRs). RRs are the exponentiated coefficients of the model parameters and are much more intuitive to interpret than raw coefficients (representing log-counts). The link function relates the metric of the predicted counts to the metric of observed counts. Rate Ratios of the predictors indicate the expected difference of the outcome based on changes in one or more explanatory predictors. Note that the (raw) coefficients of the NB model need to be exponentiated (i.e., calculated with the inverse link function) to get estimates on the original scale of the outcome (rate ratios), as negative binomial models connect predictors to dependent variables via a natural logarithm link function and therefore raw coefficients are on the log scale (Atkins & Gallop, 2007; Coxe et al., 2009). Second, we tested four models to test whether attachment predicts reactions to perceived partner transgressions (with regard to benevolence, avoidance, revenge, and rumination). For these models, normal OLS-regression was employed.

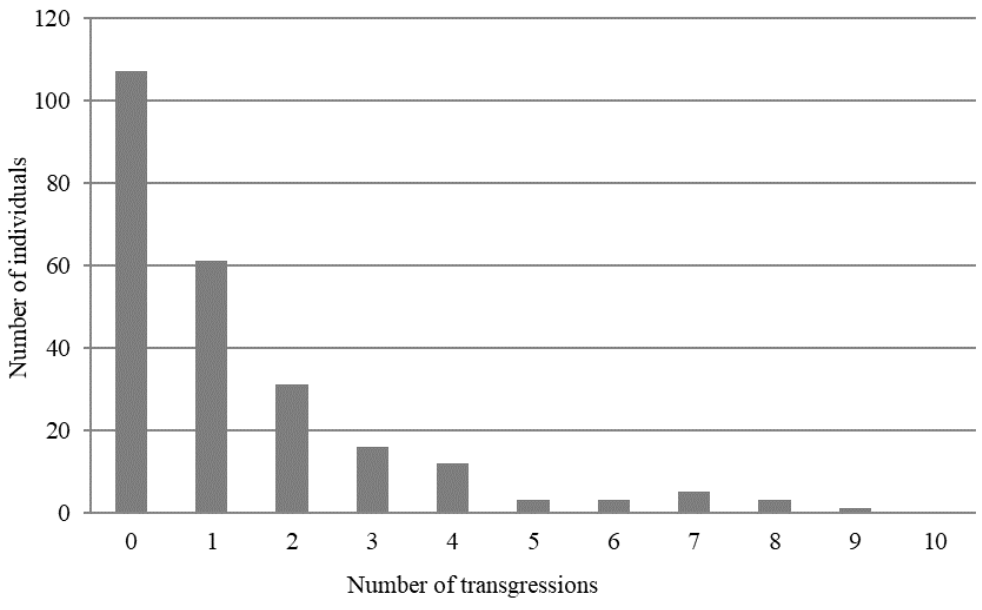

Figure 2.

Frequency of transgressions (N = 139 dyads, with n = 139 woman and n = 139 men); mean number of transgressions is 1.32 (SD = 1.82).

Subsequently, we tested whether the regression coefficients were equal between intimate partners (i.e., women and men). For that purpose, we conducted model comparisons between a constrained model with equal regression coefficients for men and women and one wherein coefficients were estimated freely across gender. For each question below, we will report coefficients of the constrained model unless the freely estimated model provided a significantly better fit. For the count models, this comparison was based on Akaike information criterion (AIC) because chi-square and related fit statistics are not available for count data. Comparing goodness of fit through AIC is common practice in count regression (cf. Hilbe, 2011). For those models based on OLS-regression, comparisons were made by applying a nested chi-square difference test ($\Delta\chi^2$).

All analyses were performed with Mplus 7.31 (Muthén & Muthén, 1998-2015), accounting for the presence of missing data by maximum likelihood (ML) algorithm. We examined the chi-square (χ^2; except for the count model), the comparative fit index (CFI), the Akaike information criterion (AIC), and root-mean square error of approximation (RMSEA) statistics, including the 90% confidence intervals.

4.3. Results

Table 6 includes descriptive statistics and zero-order correlations among the study variables. Age was positively associated with relationship length, and negatively with attachment anxiety. Likewise, relationship length was negatively associated with attachment anxiety. Gender was not significantly associated with any variables. Finally, dispositional partner dispositional forgiveness was positively related with relationship satisfaction and negatively with attachment avoidance and attachment anxiety.

Table 6. *Descriptive Statistics and Zero-Order Correlations among the Study Variables*

		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1.	Age	-										
2.	Gender	-.08	-									
3.	Relationship duration	.73**	.01	-								
4.	Attachment avoidance	.10	-.11	.03	-							
5.	Attachment anxiety	-.12*	-.04	-.19**	.51**	-						
6.	Marital forgiveness	.64	-.19	.10	-.42**	-.30**	-					
7.	Relationship satisfaction	-.06	-.02	-.02	-.65**	-.45**	.47**	-				
8.	Benevolence	.04	-.08	.16	-.17*	-.24**	.09	.17*	-			
9.	Avoidance	-.07	-0.2	-13	.50**	.34**	-.33**	-34**	-27**	-		
10.	Revenge	-.12	-.14	-.18*	.40**	.29**	-.24**	-22**	-.18*	.82**	-	
11.	Rumination	-.13	-.10	-.16	.44**	.23**	-.29**	-.24**	-.14	.75**	.67**	-
M		46.23	-	18.44	2.29	2.40	4.60	4.18	3.24	2.30	1.82	2.40
SD		14.35	-	13.49	1.23	1.66	0.92	0.84	1.64	1.41	1.35	1.38

Note. N = 139 dyads; men = 1, women = 0; * = $p < .05$; ** = $p < .01$.

Table 7. *Model Fits of APIMs*

Model	Outcome	χ^2 (df)	AIC	CFI	RMSEA (90% CI)	Δ Models	$\Delta\chi^2$ (Δdf)
M1	*Transgression Frequency* [a]	-	4484.99	-	-	-	-
M2	Transgression Frequency [b]	-	4508.84	-	-	*M1* – M2	-
M3	Benevolence [a]	0.00 (0)	-	1.00	.00 [.00 - .00]	-	-
M4	*Benevolence* [b]	6.81 (11)	-	1.00	.00 [.00 - .06]	M3 – *M4*	36.81 (11)
M5	Avoidance [a]	0.00 (0)	-	1.00	.00 [.00 - .00]	-	-
M6	*Avoidance* [b]	11.37 (11)	-	1.00	.02 [.00 - .09]	M5 – *M6*	11.37 (11)
M7	*Revenge* [a]	0.00 (0)	-	1.00	.00 [.00 - .00]	-	-
M8	Revenge [b]	20.18 (11)	-	0.88	.08 [.01 - .13]	*M7* – M8	20.18* (11)
M9	Rumination [a]	0.00 (0)	-	1.00	.00 [.00 - .00]	-	-
M10	*Rumination* [b]	3.82 (11)	-	1.00	.00 [.00 - .00]	M9 – *M10*	3.82 (11)

Note. *N* = 139 dyads; [a] = Unconstrained model; [b] = all regression coefficients are constrained to be equal for men and women. χ^2 (df) = chi square and degrees of freedom; AIC = Akaike Information Criterion; CFI = comparative fit index; RMSEA = root mean squared of approximation; 90% CI = 90% confidence intervals for RMSEA; Δ Models =comparison of models; $\Delta\chi^2$ (Δdf) = difference in chi square; italic letters mark superior fit as indicated by model comparison. *p < .05; **p <.01.

Model Selection and Gender (Non-)Equivalence

As a first step, we tested whether the associations between attachment, transgression frequency and each of the four reactions to transgression were equivalent across gender. As can be seen from Table 7, for benevolence, avoidance and rumination we found that the constrained model, with all regression paths set equal across gender, fit the data significantly better than the model that freely estimates parameters separately for men and women. This means that gender does not significantly moderate the effects of attachment predicting benevolence, avoidance, and rumination. Hence, the reported estimates for actor and partner effects are equal across gender when reporting results on benevolence (M4), avoidance (M6) and rumination (M10).

However, we found gender non-equivalence when examining the role of attachment on transgression frequency and revenge. As shown in Table 7, for transgression frequency and revenge, we found that the unconstrained model with all regression paths estimated freely for men and women fit the data significantly better. Differential effects of gender are captured by separate estimates for actor and partner effects in men and women in perceived transgression frequency (M1) and revenge (M7).

Does Attachment Predict Perceived Transgression Frequency?

We found significant actor effects of attachment avoidance on the number of transgressions in men (Table 8). The rate ratio (RR) of 0.84 (p = .04) reflects that men one *SD* above the mean of attachment avoidance report 16% less transgressions than those men who are average on avoidance. In line with our hypotheses, higher levels of attachment avoidance predicted fewer transgressions in men. However, this effect did not reach significance for women. Attachment anxiety did not significantly predict higher numbers of transgression, neither for men nor for women.

Does Attachment Predict Reactions to Perceived Transgressions?

We found no significant effects of attachment anxiety or attachment avoidance on benevolent reactions (Table 9). However, significant actor and partner effects of attachment avoidance were found for avoidant reactions. Higher levels of actor ($\beta = .33$, $p < .001$) and partner ($\beta = .37$, $p < .001$) attachment avoidance were associated with greater avoidance in response to transgressions Moreover, we found a significant actor effect of attachment avoidance on ruminative reactions ($\beta = .36$, $p < .001$). Higher levels of attachment avoidance predict higher levels of rumination about the transgression for men and women.

Significant actor ($\beta = .44$, $p < .01$). and partner ($\beta = .40$, $p < .01$). effects of attachment avoidance were also found for revenge in men, but not in women. Higher actor and partner levels of attachment avoidance in males predict higher levels of vengeful feelings and thoughts towards his partner. Attachment orientations did not significantly predict revenge in women. For complete results see Table 9.

Table 8. *Results from M1 on Transgression Frequency*

Outcome	Predictor	b	95% CI	RR
Transgression Frequency ♂	AV ♂	-0.18*	[-0.32 - -0.04]	0.84
	ANX ♂	-0.09	[-0.19 - 0.01]	0.92
	AV ♀	-0.04	[-0.17 - 0.10]	0.96
	ANX ♀	-0.04	[-0.11 - 0.03]	0.96
	NDE ♂	-1.56**	[-1.96 - -1.16]	0.21
	RAS♂	-0.26*	[-0.39 - -0.12]	0.77
	MF♂	-0.11	[-0.23 - 0.02]	0.90
	RAS ♀	0.07	[-0.09 - 0.24]	1.08
	MF ♀	-0.12	[-0.23 - -0.01]	0.89
	RD	-0.08	[-0.21 - 0.05]	0.92
Transgressions Frequency ♀	AV♀	-0.01	[-0.19 - 0.18]	0.94
	ANX♀	-0.01	[-0.13 - 0.11]	0.90
	AV♂	-0.06	[-0.26 - 0.14]	1.00
	ANX♂	-0.17	[-0.32 - 0.03]	0.99
	NDE♀	-0.70**	[-0.06 - -0.23]	0.34
	RAS♀	0.83	[-0.79 - -0.62]	0.98
	MF♀	-0.43	[-0.20 - 0.12]	0.89
	RAS♂	-0.20	[-0.27 - 0.07]	0.77
	MF♂	-0.13	[-0.26 - -0.01]	0.95
	RD	-0.02	[-0.15 - 0.11]	0.85

Note. N = 139 dyads; b = unstandardized b, from which Rate Ratios can be calculated; RR= Rate Ratio; ♀ = women; ♂ = men; NDE = number of diary entries; MF = marital dispositional forgiveness; RD = Relationship duration; RAS = Relationship satisfaction; bold letters highlight significant results. *$p < .05$; **$p < .01$.

Table 9. *Results from M4, M6, M7 and M10 on Reactions to Transgressions*

Model	Outcome	Predictor	β	95% CI		
M4	Benevolence	Avoidance self	-0.02	[-0.20	-	0.16]
		Anxiety self	-0.10	[-0.24	-	0.02]
		Avoidance partner	-0.16	[-0.36	-	0.03]
		Anxiety partner	-0.07	[-0.21	-	0.08]
		RAS self	-0.06	[-0.22	-	0.11]
		MF self	-0.06	[-0.20	-	0.09]
		RAS partner	-0.00	[-0.17	-	0.17]
		MF partner	0.23	[-0.09	-	0.37]
		RD	0.11	[-0.04	-	-0.27]
		NDE self	0.10	[0.01	-	-0.20]
		NDE partner	-0.05	[-0.05	-	0.15]
M6	Avoidance	Avoidance self	0.33**	[0.18	-	0.48]
		Anxiety self	0.10	[-0.02	-	0.23]
		Avoidance partner	0.37**	[0.20	-	0.53]
		Anxiety partner	0.00	[-0.13	-	0.12]
		RAS self	0.11	[-0.04	-	0.25]
		MF self	-0.11	[-0.23	-	0.02]
		RAS partner	0.14	[-0.01	-	0.29]
		MF partner	-0.19	[-0.31	-	-0.07]
		RD	-0.12	[-0.26	-	0.02]
		NDE self	0.03	[-0.06	-	0.12]
		NDE partner	0.06	[-0.03	-	0.15]
M7	Revenge ♂	Avoidance ♂	0.44**	[0.19	-	0.69]
		Anxiety ♂	0.05	[-0.13	-	0.24]
		Avoidance ♀	0.40**	[0.18	-	0.63]
		Anxiety ♀	-0.09	[-0.24	-	0.06]
		RAS ♂	0.11	[-0.14	-	0.36]
		MF ♂	-0.09	[-0.29	-	0.11]
		RAS ♀	0.33*	[0.11	-	0.54]
		MF ♀	-0.19	[-0.35	-	-0.03]
		RD	-0.09	[-0.24	-	0.07]
		NDE ♂	0.24*	[0.09	-	0.38]
		NDE ♀	-0.06	[-0.20	-	0.08]
M7	Revenge ♀	Avoidance ♀	0.17	[-0.07	-	0.41]
		Anxiety ♀	0.08	[-0.09	-	0.25]
		Avoidance ♂	0.26	[-0.03	-	0.54]
		Anxiety ♂	-0.14	[-0.35	-	0.06]
		RAS ♀	0.30*	[0.07	-	0.53]
		MF ♀	-0.13	[-0.31	-	0.06]
		RAS ♂	0.03	[-0.25	-	0.31]
		MF ♂	-0.38*	[-0.58	-	-0.18]

		RD	-0.30*	[-0.47	-	-0.13]
		NDE ♀	0.03	[-0.14	-	0.19]
		NDE ♂	0.14	[-0.01	-	0.30]
M10	Rumination	Avoidance self	0.36**	[0.21	-	0.52]
		Anxiety self	0.01	[-0.12	-	0.14]
		Avoidance partner	0.17	[0.00	-	0.35]
		Anxiety partner	0.10	[-0.03	-	0.23]
		RAS self	0.17	[0.02	-	0.32]
		MF self	-0.07	[-0.20	-	0.07]
		RAS partner	0.03	[-0.13	-	0.19]
		MF partner	-0.12	[-0.25	-	0.01]
		RD	-0.14	[-0.29	-	0.00]
		NDE self	0.02	[-0.08	-	0.12]
		NDE partner	0.06	[-0.04	-	0.15]

Note. N = 139 dyads; ♀ = women; ♂ = men; NDE = number of diary entries; MF = marital dispositional forgiveness; RD = Relationship duration; RAS = Relationship satisfaction. *p < .05, **p < .01.

4.4. Discussion

This study extended previous research by examining how attachment orientations in one partner predicted their own and their romantic partners' perception of transgressions and reactions to these in everyday life. Consistent with our hypothesis we found that higher attachment avoidance was related to a lower number of transgressions in men, though the effect was not significant for women. Partner-levels of attachment did not predict the number of transgressions. We found that higher attachment avoidance was related to more avoidant, revengeful (only for men) and ruminative reactions. In contrast to our hypothesis, attachment anxiety was not predictive with respect to any of the outcomes of interest.

Attachment orientations were differentially related to perceived transgression frequency. On the one hand, we did not find evidence for a positive association between attachment anxiety and the number of experienced transgressions. This suggests that more anxious individuals did not report more transgressions than individuals with lower levels of

attachment anxiety in daily life. Campbell and colleagues (2005) found that attachment anxiety is positively related to the frequency of perceived conflict in a romantic relationship, underlining the notion that highly anxious individuals may *overdetect* potential cues given their strong motivation to identify abandonment or rejection from their partners. However, we could not replicate these findings. Alternatively, rather than the absolute amount of days on which transgressions were perceived, it may rather be the variability of perceiving transgressions across time and situations that may be predicted from individual differences in attachment anxiety. With regard to perceived conflict and further important relational constructs such as relationship satisfaction, closeness or commitment, recent findings indicate that while attachment avoidance predicts average levels of conflict, attachment anxiety predicts daily variability in these outcomes (Cooper et al., 2017; Totenhagen, et al., 2016). Same processes are highly likely to operate with regard to perceiving transgressions as discrete events within a romantic relationship. Hypervigilance and pronounced mood swings may in that sense rather cause pronounced variability in perceiving partner transgressions, leaving average tendencies (as measured in the current study) potentially unaffected.

In line with this idea, we found evidence for a negative association between attachment avoidance and the number of perceived transgression in men. The more avoidant the male partners were, the fewer transgressions they perceived. However, findings indicate that women's perceived transgression frequency did not vary based on their level of attachment avoidance. The defensive processes characteristic for attachment avoidance may be counteracted by women's tendency to focus on emotional bonds and relationships. This focus on relationships is found to be higher in females than in males (Buss, Larsen, Wetsen, & Semmelroth, 2001; Cross & Madson, 1997). This differential gender effect is consistent with previous studies showing that attachment avoidance, as a typical male gender role, may

manifest differently in women and men when monitoring relationships for potential threat (e.g., Collins & Read, 1990; Li & Fung, 2014; Gabriel & Gardner, 1999). However, the significant finding in men supports the notion of attachment avoidance shaping construal of relationship experiences via defensive processes. This relation has been extensively studied with experimental designs and under controlled conditions (Chun et al., 2015; Collins et al., 2006; Davis & Schwartz, 1987; Fraley & Brumbaugh, 2007; Fraley et al., 2000). Results are suggesting that this relation can also be found in couples' natural life, supporting the notion that attachment avoidance triggers selective exclusion and defenses against stimuli activating the attachment system (Mikulincer & Shaver, 2005). In contrast to the hypotheses, partner levels of attachment did not predict the number of transgressions. Results suggest that higher levels of attachment insecurity do not account for a higher number of perceived transgressions in one's partner. Even though previous studies evidenced that attachment insecurities manifest in dysfunctional relationship behaviors (which raise the likelihood of generating hurt feelings in the other partner; Kilmann, Finch, Parnell, & Downer, 2013; Li & Chan, 2012), this association did not become apparent in our results.

A key assumption of the study was that attachment orientations would shape reactions when a transgression is perceived at actor and partner level. Again, results yielded partial support for our hypotheses as attachment orientations were differentially related to reactions to transgressions. One the one hand, the results with respect to attachment anxiety are consistent with our results regarding transgression frequency, insofar that attachment anxiety and reactions to transgressions in daily life were also unrelated. This lack of support for the notion of attachment anxiety shaping reactions to negative relational events on actor and partner levels is surprising and may have occurred for several reasons. First, the forgiveness and rumination reactions may have special significance in this context and differ from other

relational processes that have been examined in recent studies (Brassard et al., 2009; Feeney 2003). Potentially, the association between attachment anxiety and (un)forgiving reactions to experienced transgressions might go in both directions and on average, in a way that attachment anxiety may one the one hand foster immediate and even premature attempts to forgive due to anxious individuals' predominant concerns about abandonment and loss of one's partner (Martens, 2013; McNulty, 2010). On the other hand, attachment anxiety is associated with escalating conflict and intensifying negative emotions associated with the experienced transgression, which in turn functions as severe obstacle to forgive (Campbell et al., 2005; Overall et al., 2014). Again, these conflicting impulses in those with greater attachment anxiety may overall account for increased variability across time and situations, but not for average levels of forgiving reactions in daily life (Cooper et al., 2017; Totenhagen, et al., 2016).

In line with our hypotheses, attachment avoidance was significantly associated with several reactions in response to a transgression. Attachment avoidance predicted avoidant reactions both in terms of actor and partner effects, indicating that rejecting closeness and intimacy impedes forgiveness in a relationship, irrespective if attachment avoidance stems from the partner that felt transgressed or the partners from whom the transgression was perceived. Results indicate that reestablishing closeness in a romantic relationship subsequent to a transgression takes two and that distancing strategies following a transgression can be driven by one's own as well as by one's partner's levels of attachment avoidance.

Furthermore, we found that men with higher levels of attachment avoidance showed more vengeful reactions. In addition to this actor effect we also found a partner effect of attachment avoidance on vengeful reactions for men. However, attachment avoidance did not predict revengeful reactions in women. This finding is consistent with research showing

gender differences in revenge (Ghaemmaghami, Allemand, & Martin, 2011; Miller, Worthington & McDaniel, 2008). Taking revenge on one's partner as a response to hurt feelings can be judged as a maladaptive strategy and the conceptual counterpart of forgiveness, as it reinforces and prolongs hurt and negative affect in a relationship. Amongst many other factors, revenge may then account for the frequently observed relation between attachment avoidance and negative relationship outcomes such as decreased relationship satisfaction, mutual trust and caring or even the occurrence of physical and psychological aggression (Li & Chan, 2012).

In addition, greater attachment avoidance also predicted more ruminative reactions. This finding is in contrast with our hypothesis that avoidant individuals show less rumination about negative relationship events due to defensive processes. Furthermore, greater attachment anxiety did not predict heightened rumination about the transgression. This is not in line with extant literature, indicating that attachment anxiety, but not attachment avoidance is associated with stronger ruminative tendencies (Chung, 2014). This divergence of findings can be explained in future work through the assessment of different types of rumination. In the current study, we only looked at immediate rumination following an actually experienced transgression and not at dispositional levels of rumination. Hence, when initially perceived, greater attachment anxiety manifests in extreme display of hurt feelings, aiming to induce guilt in the partner in order to secure partner responsiveness and repair efforts (Overall et al., 2014). In line with that, attachment anxiety may not lead to inward-directed attention on one's distress as it is the case for rumination, but rather in open and high-arousal display of negative affect to achieve desired outcomes of reassurance and closeness during relational threat (Mikulincer & Shaver, 2005). When measured as a reaction to a relational transgression, rumination may also feature aspects of detachment and deactivation which are

characteristic for attachment avoidance (Mikulincer & Nachson, 1991). Rumination is often self-focused and stands in contrast to emotion regulation strategies based on reciprocity and interpersonal exchange (cf. Nolen-Hoeksema et al., 2008). Transgression-related rumination may indicate a striving for self-reliance and turning away from one's partner when thoughts about negative relationship events cannot be suppressed fully. Hence, empirical studies evidenced positive associations between attachment avoidance and rumination in the context of relationship stress or depression (Lanciano, Curci, Kafetsios, Elia, & Zammuner, 2012; Reynolds, Searight, & Ratwik, 2014).

Finally, even though some of the control variables were significantly related to the outcomes of interest, the associations between attachment orientations and perception of transgressions as well as subsequent reactions did hold. It seems that our findings can be generalized across couples with varying degrees of relationship satisfaction and length. Interestingly, as can be seen from Table 9, attachment orientations were more strongly related to forgiving reactions during the 10 days of data sampling than participants' baseline ratings of forgiveness of their partners. As a finding, this demonstrates once more the high relevance of attachment-orientations for relationship repair processes for couples during relational distress.

Taken together, greater attachment avoidance was predictive of more "unforgiving" reactions to transgressions, both with respect to actor- and partner effects. In that sense, lower levels of avoidance might function as a resource, which allows romantic partners to overcome transgressions quite easily. Both partners' attachment avoidance seem crucial, emphasizing reciprocity and dyadic exchange processes in coping with relational transgressions in romantic partnership. With regard to actor effects, it is likely that higher levels of attachment avoidance interfere with forgiving reactions, as these are proactive approaches to regain

intimacy and psychological closeness with one's partner, which ultimately contradicts goals and needs for those with strong attachment avoidance. More interestingly, above and beyond one's attachment levels, it is the partner's level of attachment avoidance that ultimately impedes forgiving him or her. Research has shown that forgiveness in the person that felt hurt is eased if the "offender" apologizes, openly expresses empathy and self-discloses about inner states of mind (Gottmann, 1994; McCullough et al., 1998). The stronger an individual's attachment avoidance, the less likely these intimacy-creating overtures are shown, making it more difficult to be forgiving with a more avoidant partner. In that sense, psychologically distant states within couples following episodes of hurt feelings seem to be not solely created by an active withdrawal in one partner as an active response when a transgression is perceived (actor effect), but also by the other's partner's behaviors of keeping this partner at "arm's length", making it more difficult to forgive a partner with greater attachment avoidance (partner effect). Results indicate that heightened levels of attachment avoidance in only one partner of the dyad interrupt benign cycles of relationship maintenance (Mondor, McDuff, Lussier, & Wright, 2011).

Limitations and Contributions

The present study is limited in ways that should promote future research. In this study, we assessed transgression frequency in terms of the number of days on that transgressions were perceived (sum-score across days) and post-transgression reactions (mean across days, when transgressions were perceived). In future studies, assessing more detailed information on precursors, consequences, and of the transgressive event itself with extended sampling duration would allow for more in-depth analyses on how attachment orientations may manifest in perception of partner transgressions. In addition, future studies should make use of a fully dyadic approach when measuring transgressions and not only ask if individuals

have experienced a transgression, but also ask whether they have actively transgressed against their partner. This information then could be used to address issues of similarity and synchronicity of self and partner perspectives on transgressions in daily life. In line with that, we assessed the reactions to transgressions only one time per day. It would be worthwhile to follow each experienced transgression with multiple repeated assessments.

Despite these limitations, the present work makes novel contribution to the field in at least two ways. First, it addresses the role of attachment in the context of interpersonal functioning in romantic relationships by linking attachment orientations to transgressions situated in couple's authentic life. By examining potential outcomes of attachment in *life as it is lived* in romantic partners, this strategy of daily sampling moves attachment research once more from lab to life (Bolger et al., 2003; Wrzus & Mehl, 2015). Second, we employed advanced analytic strategies (count models) to predict transgression frequency. These strategies are appropriate to study infrequent behavioral outcomes; but they are still relatively seldom used in psychological research (Atkins & Gallop, 2007; Hilbe, 2011). Moreover, we adapted this modeling approach to the field of dyadic data analyses. Especially when studying events of low frequency such as transgressions (see Figure 2), count modeling is a methodologically adequate and rigorous approach to examine these, on average, rarely occurring, but nonetheless important features of romantic relationships.

In addition, the results underline the predictive value of individual differences in attachment orientations for perceiving and dealing with relational transgression, even after including several control variables, such as relationship duration, relationship satisfaction or dispositional levels of partner forgiveness. Results once more demonstrate the value of using attachment theory as a framework to understand dyadic processes in couples' everyday life. In that sense, our results suggest that practitioners should be particularly mindful of

accounting for both partner's attachment orientations when working with clients on relational transgressions and ways of overcoming past transgressions. According to the study's findings, it is both partners' attachment avoidance that tend to shape the hurt partner's forgiving tendencies when faced with a transgression.

Conclusion

The present study supports the assumption that individual differences in attachment orientations are important in the context of perceiving and dealing with transgressions in romantic relationships in daily life. Particularly, attachment avoidance was associated both with the number of perceived partner transgressions and with reactions to transgressions. The predictive associations were observed both in terms of actor and partner effects. However, partner effects of attachment only become apparent in reactions to transgressions, not in perception thereof. Results support the notion that forgiveness in romantic couples is a dyadic process, strongly affected by interpersonal exchange processes and that it is the amount of attachment avoidance in both partners, which governs if the offended partner feels able and willing to forgive the perceived transgression. This is in line with previous research, evidencing detrimental effects of attachment avoidance for dyadic adjustment and adaptive relationship processes. Identifying how attachment orientations relate to transgressions and relationship maintenance behavior such as forgiveness is essential to understanding how individuals within romantic relationships perceive and navigate through the "downs" of relationship experiences.

Finally, an enhanced understanding of those factors that influence both the perception of transgressions and the reactions thereafter has clinical relevance and implication for both counseling and therapy with couples and individuals. As results indicate, it is attachment avoidance that warrants special attention, as with regard to transgression-related repair

processes in a couple, it is able to shun closeness in both partners of the dyad. To date, several attachment theory-informed programs helping clients overcome hurt feelings in romantic relationships have been developed (Aalgard, Bolen & Nugent, 2016; Worthington, Jennings, & DiBlasio, 2010; Zuccarini, Johnson, Dalgleish, & Makinen, 2013). These programs may benefit from having both partners actively involved, reflecting upon their attachment avoidance and how this might affect how they perceive and deal with transgressions in their relationships, both as *actor* and *partner*.

5. Study 3: Attachment Security and Need Satisfaction in Old Age

Attachment Security and Need Satisfaction in Daily Life of Older Adults [6]

5.1. Introduction

As Bowlby (1988) assumed, attachment supports positive adjustment and optimal functioning *from the cradle to the grave.* Although this theoretical argument has been around for long only few empirical studies investigated age effects in adult attachment supporting the importance of secure attachment as leading to more positive outcomes over the whole life span (Diehl, Elnick, Bourbeau, & Labouvie-Vief, 1998; Mickelson, Kessler & Shaver, 1998, Van Assche et al., 2013). First cross-sectional studies evidenced that attachment security is associated with indices of increased functioning and adaption to life in old age. In old age, attachment security is linked to increased experiences of positive emotions (Magai, Consedine, Gillespie, O'Neal, & Vilker, 2004), lower feelings of loneliness and anxiety (Kafetsios & Sideridis, 2006), more adaptive coping as caregivers (Gillath, Johnson, Selcuk, & Teel, 2011), and during illness and severe medical conditions such as dementia (e.g., Bisiani & Angus, 2013; Browne & Shlosberg, 2005; Miesen, 1998). Results of one of the few longitudinal studies involving older adults in attachment research evidenced intraindividual change in attachment security across six years in different age groups (Labouvie-Vief & Zhang, 2004). Results demonstrate that attachment security is malleable over time also in old age. Moreover, when older adults change towards a more secure attachment style, they tend

[6] A similar version of this chapter has been submitted for publication to "Psychology and Aging" (Martin, Horn, & Allemand).

to show more adaptive coping and higher levels of well-being. Despite of potential positive consequences of developmental change in attachment security, no study so far has yet addressed short-term associations between momentary attachment security and health and well-being related processes in daily life. The current study thus aims at unraveling attachment processes and their association with positive outcomes in older adults' daily life to better understand how attachment security can foster adaption and well-being, and why these processes may be of special significance in older adults.

Conceptualizing Momentary Attachment Security

Attachment is a multidimensional construct, comprising both stable elements and state-dependent properties (Bowlby, 1988; Fraley 2002; Fraley, Vicary, Brumbaugh, & Roisman, 2011; Mikulincer & Shaver 2007a). Recently, experimental priming studies have shown that momentary attachment can be activated that override the effects of trait attachment (Gillath, Selcuk & Shaver, 2008; Rowe & Carnelly, 2003). Momentary attachment security is marked by increased salience of having a *safe haven* and a *secure base* (Luke, Sedikides, & Carnelley, 2012; Mannarini & Boffo, 2014; Murray, Holmes, & Griffin, 2000). Based on recent work on momentary attachment security in daily life (e.g., Sadikaj, Moskowitz, & Zuroff, 2015) we define momentary attachment security as a person's subjective persuasion to be loved and cared for with the absence of enacting strategies of attachment insecurity (e.g., avoiding intimacy or actively doubting an attachment figure's availability or responsiveness). For example, priming studies provided evidence that boosting attachment-security and activating secure-base scripts (Mikulincer & Shaver, 2007b) lead to an increase in positive affect and even increased openness to new information and experiences in terms of *exploration* (Green & Campbell, 2000).

Research has shown that attachment security varies within individuals in daily life, suggesting that individuals do not always feel the same degree of attachment security across time and situations in their everyday life (Gillath, Hart, Noftle, & Stockdale, 2009; Xu & Shrout, 2013). Variations in attachment security are typically triggered by external events such as perceived conflict, acceptance or rejection (Davila & Sargent, 2003; Haak et al., 2016; Zhang, 2009). However, increases in attachment security may not necessarily be caused by actual interpersonal experience (e.g., Davila & Sargent, 2003) but can for example, flow from reminiscence on attachment related experiences or from affectionate touch (Gillath et al., 2008; Jakubiak & Feeney, 2016; Luke et al., 2012). Increases in momentary attachment security are the starting point for the so-called *broaden-and-build cycle of attachment security* (cf. Mikulincer & Shaver, 2001, 2009, following Fredrickson, 2001). According to this model, attachment security is assumed to be adaptive, as it broadens the thought-action repertoires and personal resources in a given moment, allowing for "greater emotional equanimity, better personal and social adjustment, more satisfying close relationships and autonomous personal growth" (Mikulincer et al., 2009, p. 616). Empirical work supports this assumption by showing that momentary attachment security leads to feelings of energy (Luke et al., 2012) and lower anxiety (Gillath et al., 2009). In contrast, momentary attachment insecurity tends to narrow the momentary thought-action repertoire (e.g., Collins & Gillath, 2012; Saleem, et al., 2015).

So far, the studies on momentary attachment security in daily life only investigated younger and middle-aged adults. However, momentary attachment security should mark hallways in the daily life of older adults, in which they can most efficiently and constructively satisfy needs essential to well-being. Momentary attachment security is of particular interest in old age, as an increased socio-affective orientation should make

momentary beliefs and feelings about intimate relationships more relevant for everyday functioning (Carstensen, Fung, & Charles, 2003; Charles & Piazza, 2009). Further, a large body of research indicates that the daily life of older adults differs from those of younger adults with regard to those events possible accounting for variations in momentary attachment security. For example, older adults tend to face fewer interpersonal stressors and conflicts (Stawski, Sliwinski, Almeida, & Smyth, 2008) and thus fluctuate less in various domains affected by interpersonal events such as affect (Brose, Scheibe, Schmiedek, 2013; Röcke, Li, & Smith, 2009). Due to fewer stressors caused by older adults' highly selected social networks (Antonucci, 1994; Antonucci, Akiyama, & Takahashi, 2004), it may be assumed that older adults show relatively high levels of stability of attachment security over time. To date, it is unclear how variable or stable momentary attachment security in daily life of older adults is. Consequently, not much is known about the correlates of momentary attachment security in older adults' daily life and if these relate to beneficial or salutary outcomes. This would be important, however, as attachment security should facilitate need satisfaction and thus, well-being in old age.

Momentary Attachment Security as a Resource for Need Satisfaction in Daily Life

Similar to attachment theory, self-determination theory is also concerned with optimal functioning, well-being and identifying those factors most vital to human flourishing (Deci & Ryan, 1985, Ryan & Deci, 2017). According to self-determination theory, there are three basic universal psychological needs, whose satisfaction is essentially related to well-being at every stage of life. To function optimally, a person must feel close and connected with others (need for relatedness), have strong feeling of self-efficacy and control (need for competence), and feel volitional and autonomous about one's life and actions (need for autonomy). These three needs are objectively beneficial, and their satisfaction predicts well-being and

adjustment (Ryan & Deci, 2017). Research has shown that momentary need satisfaction fluctuates over time and relates to well-being at the within-person level across different types of relationships and situations with individuals finding their needs more satisfied in certain contexts than in others (Patrick et al., 2007; Reis, Sheldon, Gable, Roscoe, & Ryan, 2000).

Increases in momentary attachment security should mark situations in which individuals are especially capable to satisfy their needs for relatedness, autonomy and competence at the within-person level. Next to need satisfaction in terms of relatedness, attachment security should also affect momentary processes of positive adjustment in domains, which are not primarily social. This is in line with prior research, indicating that need satisfaction in various social and non-social domains is related to increased attachment security (Doyle & Cichetti, 2017; Feeney & Thrush, 2010; Mikulincer, Shaver, Sapir-Lavis, & Avihou-Kanza, 2009; Waters & Waters, 2006). Feeling more securely attached than usually should support need satisfaction as individuals are then capable of simultaneously engaging in cognitive and behavioral strategies that support both autonomy and competence in that given moment (Elliot & Reis, 2003; Feeney & Thrush, 2010; Feeney & Van Vleet, 2010; Whipple, Bernier, Mageau, 2011).

However, satisfaction of basic psychological needs in daily life is multi-determined. Individual differences in the capacities and various resources of older adults strongly affect need satisfaction and everyday functioning (Fiksenbaum, Greenglass, & Eaton, 2006; Steverink, Westerhof, Bode, & Dittmann-Kohli, 2001). Hence, health-related resources should moderate the association between attachment security and need satisfaction. The fewer resources older adults have to meet their basic needs the more important attachment security should be. The role of attachment security for need satisfaction should be stronger in those individuals with lower health status compared to high-functioning older adults. For

example, better physical health should enable feelings of autonomy and competence more readily in the absence of momentary attachment security, as these individuals are overall more likely to meet goals self-sufficiently and without other's support. On the contrary, it is difficult for a person with low health status to feel competent or autonomous when he or she therefore is in need for others' help and support in certain tasks, but at the same time dreads the need for other's help or fears that others will not be dependable or responsive when needed (Fiori, Consedine, & Magai, 2008). Thus, momentary attachment security should be more influential for need satisfaction for older adults with poorer physical health.

Current Study

The first goal of this study was to identify substantial within-person variation with regard to attachment security in older adults' daily life. Second, we aimed to show that momentary increases in attachment security go along with salutary outcomes in terms of increased need satisfaction in older adults, reflecting processes contributing to health and well-being in old age. We assumed that within-person increases in attachment security covary with a momentary increases of need satisfaction in relatedness, autonomy and competence. Third, we explored whether age and subjective health moderate this association between attachment security and need satisfaction. In other words, we explored whether attachment security becomes more relevant for need satisfaction in older adults, when other health-related resources are limited.

5.2. Methods

Participants

Participants come from the longitudinal study Realizing Healthy Years Through Health Maintenance (RHYTHM) in Switzerland. The ethics committee for psychological and related research of the University of Zurich approved the study prior to data collection. One hundred-

thirty-six older adults aged 60 to 91 years (M = 70.45, SD = 6.27; 58.8% female) participated in this study. Requirements to participate in this study were that the older adults had to be 60 years of age or older, cognitively able to pass the mini-mental state examination (with scores > 24; Folstein, Folstein & McHugh, 1975), and not suffering from depression (i.e., scores < 18; Hautzinger, Bailer, Worall, & Keller, 1994). All of the individuals that signed up for participation met these inclusion criteria.

Regarding the marital status, 7.4% of the participants were single, 46.3% were married, 2.2% were separated and 30.1% were divorced, and 13.2% were widowed. For those currently in a relationship (married or non-married), mean relationship duration was 28.29 years (SD = 16.36). Of the participants, 3.7% attended secondary school with lower school track, 15.4% attended secondary school with higher school track, 3.7% attended secondary school with the Matura graduation, 25.7% attended a university of applied sciences, 20.6% attended university, and 30.9% reported to have another educational background (e.g., vocational training). With regard to work status, 78.8% of the participants were retired, 2.9% worked full-time and 18.4% worked part-time.

Procedure

Participants were recruited via advertisements in two national newspapers and via a database of older individuals in study participations. The study lasted 12 days in total. On day 1, participants came to the laboratory for a screening session and a baseline survey (pre daily assessments). They received information about the study, declared their informed consent, solved different cognitive tasks and then answered a variety of baseline questionnaires. Subsequently, participants were provided with an Android mobile phone as well as they were instructed how to use it. Participants were advised to call a study hotline if they experienced problems concerning the mobile phone. At the end of the initial session, participants were

handed out a smartphone and were instructed by research assistants how to use it in order to fill out the daily intensive longitudinal assessments, with prompts starting in the subsequent morning. The study was graded that approximately 20 participants began the study in the same week with a new cohort of participants beginning the study two weeks later.

From day 2 to 11, participants were sampled three times a day.[7] During these 10 days, participants were invited to answer items concerning their momentary attachment security and momentary need satisfaction on the mobile phone triggered by a ring tone. Rings were timed randomly within three fixed time periods each day, that is between 08:00 - 11:00 am (morning), 01:00 - 04:00 pm (noon) and 06:00 - 09:00 pm (evening). The rings were at minimum 110 minutes apart from the next one. If participants did not respond to a ring, they were reminded after up to a total of ten times. Moreover, participants could decide to delay responding and were then reminded again by a ring tone (within the same time period). The software movisensXS version 4474 (movisens GmbH, 2016) was employed to program the daily questions on the Android mobile phones.

On day 12, participants attended a final laboratory session during which they returned the mobile phones, filled in the baseline survey (post daily assessments) as well as a feedback questionnaire. They were paid CHF 150 (~ $ 153) for their participation. At the end of the study, participants received a personalized profile of their data that emerged from the study. Further, all participants were invited to take in a half-day-social event with the project team sharing goals and results of the study.

[7] The intensive momentary assessments started on day 1 as participants were provided with the mobile phone, but we excluded day 1 from data analyses because some participants received the mobile phone in the morning, whereas others not until the evening, thus missing measurement prompts. Therefore, ten consecutive days were used for the data analyses of daily assessments.

Importantly, not all questionnaires were prompted three times a day to minimize participant burden and to maintain participant motivation (Reis & Gable, 2000). Given that our variables of interest were included in the morning and afternoon questionnaires; the present data analyses are based on these measurement occasions. On average, participants provided data on 94% of all possible assessments of momentary attachment and momentary need-satisfaction. Hence, on average, 2,554 points of measurements (136 participants, sampling twice a day across 10 days) exist due to the intensive longitudinal sampling, assessing daily variations attachment and need-satisfaction.

Control and moderator variables. Four time-invariant variables were used as control variables in all models. First, we controlled for gender and general cognitive status based on participants score in the mini-mental state examination assessed at baseline (Folstein et al., 1975; MMSE; with scores ranging from 25 and 30) in all models. Second, we controlled for age and subjective health status (Ware, Kosinski, & Keller, 1995; 1996; SF-12; a with physical and mental health composite score[8] (ranging from 37.51 to 48.03) and also examined these two variables as moderators.

Measures

Momentary Attachment Security. An adapted version of state adult attachment measure (SAAM, Gillath et al., 2009) was used to assess within-person fluctuations of attachment security in everyday life. The SAAM assesses temporary fluctuations of attachment security, avoidance and anxiety with 21 items (with 7 items measuring each of the three domains). In order to reduce participant burden for daily sampling, we used those two items with the highest factor loadings (Gillath et al., 2009, p. 366) per domain (e.g., “I feel

[8] Physical and mental health composite scores are computed using the weighted scores of the twelve questions and can range from 0 to 100, where a zero score indicates the lowest level of health measured by the scales and 100 indicates the highest level of health (Ware et al., 1995).

like I have someone to rely on", "If someone tried to get close to me, I would try to keep my distance" and "I really need to feel loved right now"). Respondents answered each of the 6 items using a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Items assessing anxiety and avoidance were reverse coded and aggregated with the items assessing attachment anxiety and avoidance to get an estimate of momentary attachment security. The within-person reliability estimate ω (Bolger & Laurenceau, 2013; Shrout & Lane, 2012) for attachment security was .89.

Momentary Need Satisfaction. In line with Heppner et al. (2008) we used six items to assess within-person fluctuations of need satisfaction in everyday life (two items per domain, e.g., relatedness "At the moment, I have a strong sense of intimacy with the people I spend time with", competence "At the moment, I am capable of what I am doing", and autonomy "At the moment, my choices are based on my own interests and values"). Respondents answered each of the 6 items using a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). For state need satisfaction, the within-person reliability estimate ω for was .80. The ω estimates for all three domains were .56 (ranging from .557 to .563).

Statistical Analysis

We used multilevel analysis to investigate our research questions (Bolger & Laurenceau, 2013; Raudenbush & Bryk, 1992). With multilevel modeling, it is possible to estimate within-person processes between variables for each individual, taking into account the potentially different intercepts and slopes of each participant. Moreover, multilevel modeling enables researchers to differentiate within-person and between-person processes and to disentangle how variables wax and wane together within a person over multiple measurement points. Following Bolger and Laurenceau (2013), we included a between-

person version and a within-person version of the same variable to control for the between-person effects and to truly examine the within-person variation. The between-person version of our independent time-varying predictors were the person-means. The within-person version of our independent time-varying predictors were computed by subtracting the person-mean from the grand-mean centered variables. Age, gender (male = 1, female = 2) and MMSE score were grand-mean centered for the analysis. The variable time reflected the ordinal time point of the dual daily assessments (0 to 19). We did not expect systematic mean-level changes in the variables of interest across seven days. However, we might expect reactivity effects and individual differences over time. Therefore, we controlled for time in all our models (cf. Bolger & Laurenceau, 2013).

Statistical analyses were carried out in three steps. First, we examined within-person variability in attachment security and need satisfaction. We examined the nested structure of the data by computing intraclass correlation coefficients (ICCs) and compared how much of the total variance lied within-person. The ICC describes the amount of between-person variance in regard to the total variance. Second, we investigated within-person associations between attachment security and need satisfaction and controlled for age, gender, general cognitive status, subjective health and time (Model 1). This model automatically estimated cross-level interactions of within-person associations (i.e., moderation of the within-person association of attachment security and need satisfaction). Third, we tested whether the within- and between-person associations in attachment security and need satisfaction were moderated by age and subjective health (Model 2). All models were estimated using Mplus 7.31 (Muthén & Muthén, 1998-2015).

5.3. Results

Zero-order correlations and descriptive statistics of the study variables are presented in Table 10. The ICC for attachment security indicates that 60.8% of the total variance lied between-persons and 39.8% lied within-persons. Similarly, the ratings of daily need-fulfillment were non-independent within individuals with ICCs of 57.2% for relatedness, 43.6% for competence and 56.0% for autonomy. Findings indicated substantial within-person variance in momentary attachment security and need satisfaction.

Next, we tested Model 1 that consisted of the outcome variables momentary need satisfaction in relatedness, competence and autonomy, the focal predictor within-person daily attachment security and the control variables person-mean of age, gender, MMSE score and time. The findings showed that momentary attachment security was positively associated with within-person momentary need satisfaction, meaning that an increase of one unit in attachment security within-person was associated with an increase of 0.38 ($p < .01$) in momentary relatedness, an increase of 0.51 ($p < .001$) in autonomy and an increase of 0.64 ($p < .001$) in competence. Between-person associations of attachment security and need satisfaction replicated within-person associations, indicating that those individuals who generally report higher levels of attachment security also tended to report higher levels of relatedness (b = 0.82, $p < .001$), autonomy (b = 0.58, $p < .001$), and competence (b = 0.51, $p < .001$) in their daily life. None of the control variables did not significantly affect the outcomes of interest.

Finally, the results of the random effects showed a significant variance in intercepts and in the within-person association between momentary attachment security and momentary need satisfaction (Table 11, random effects). This implies that participants differed in the size of this within-person association and that these differences may be in part explained by a

between-person variable. However, age did not significantly moderate the within-person association between attachment security and need satisfaction in any of the three needs. Subjective health status did moderate the within-person association between momentary attachment security and momentary autonomy. The within-person association between momentary attachment security and momentary autonomy was significantly stronger in those individuals with low health status than in those with high health status (interaction: b = 0.06, $p < .05$; see Figure 3).

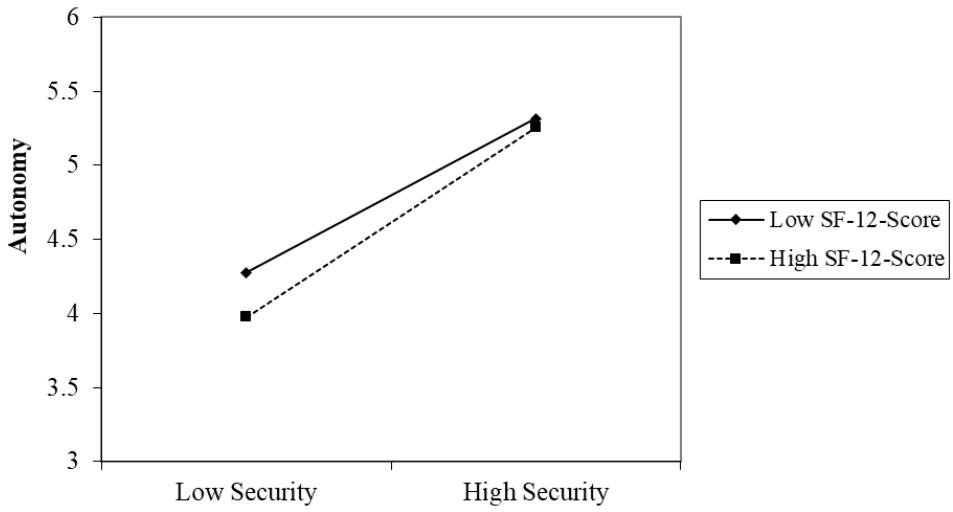

Figure 3

The effect of attachment security (for high and low attachment security; -1 respectively +1 standard deviation) on autonomy at the within-person level as a function of health status.

Table 10 *Between-Person Descriptive Statistics and Correlations among the Study Variables*

	1.	2.	3.	4.	5.	6.	7.	8.
1. Age	-							
2. Gender	.07	-						
3. MMSE	-.24**	.03	-					
4. Health	-.29***	.22**	.13	-				
5. Mean Attachment Security	-.08	.11	.03	.17*	-			
6. Mean Autonomy	-.02	-.01	-.07	.04	.39***	-		
7. Mean Competence	-.23**	.04	.12	.06	.38***	.39***	-	
8. Mean Relatedness	-.07	-.01	-.07	.12	.34***	.37***	.48***	-
M	70.45	-	27.79	43.43	3.98	4.79	4.70	4.60
SD	6.24	-	1.15	2.11	0.91	1.21	1.25	1.38

Note. $N = 136$ participants. The scale for attachment security and need satisfaction ranged from 1 to 7. Female gender was coded 1 and male gender was coded 2. Momentary measures on mean attachment security, mean autonomy, mean competence and mean relatedness are based on daily raw data (not yet split into within-and between-person components). *$p < .05$, ** $p < .01$, *** $p < .001$.

Table 11 Estimates for Multilevel Model of Need Satisfaction as a Function of Attachment Security

	Model 1						Model 2					
	Relatedness		Autonomy		Competence		Relatedness		Autonomy		Competence	
	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*
Fixed effects												
Intercept	4.71***	0.23	4.75***	0.22	4.63***	0.20	4.72***	0.23	4.71***	0.22	4.62***	0.21
Time	-0.003	0.003	-0.002	0.003	0.003	0.003	-0.003	0.003	-0.002	0.003	0.003	0.003
Age	-0.01	0.01	0.021	0.01	0.002	0.01	-0.01	0.01	0.021	0.01	0.002	0.01
Gender	0.12	0.10	-0.14	0.15	-0.09	0.16	-0.11	0.15	-0.04	0.15	-0.05	0.16
MMSE	0.03	0.07	-0.09	0.06	-0.05	0.07	-0.07	0.07	-0.09	0.06	-0.05	0.07
Health	-0.06	0.04	-0.09	0.04	-0.07	0.03	-0.06	0.04	-0.09	0.04	-0.07	0.03
Within Security	0.38**	0.15	0.51***	0.14	0.64***	0.14	0.38**	0.15	0.51***	0.14	0.64***	0.14
Within Security by age	-0.01	0.01	-0.01	0.01	-0.01	0.01	-0.01	0.01	-0.01	0.01	-0.01	0.01
Within Security by health	-0.01	0.03	0.06*	0.02	0.02	0.02	-0.01	0.03	0.06*	0.02	0.02	0.02
Between Security	0.82***	0.10	0.58***	0.10	0.51***	0.09	0.83***	0.10	0.60***	0.10	0.53***	0.01
Between Security by age	--	--	--	--	--	--	0.00	0.02	-0.03	0.02	-0.02	0.01
Between Security by health	--	--	--	--	--	--	0.08	0.05	0.04	0.05	-0.001	0.04
Random Effects												
Within Security	0.16***	0.03	0.15***	0.03	0.10***	0.03	0.16***	0.03	0.15***	0.03	0.10***	0.03
Within Residual Variance	0.66***	0.02	0.55***	0.02	0.77***	0.02	0.66***	0.02	0.55***	0.02	0.77***	0.02
Between Residual Variance	0.69***	0.09	0.64***	0.08	0.52***	0.07	0.68***	0.08	0.60***	0.08	0.51***	0.06
Model Fit												
AIC	18947.98						18948.15					

Note. N = 2,556 observations. Coefficients shown are unstandardized coefficients. SE represents the standard error of the unstandardized regression coefficients. Male gender was coded as 2, female gender as 1. *$p < .05$, ** $p < .01$, *** $p < .001$.

In Model 2, we added age and subjective health status as moderator variables of the between-person association of attachment security in need satisfaction to the previous model. In doing so, we examined if age and subjective health moderate the average relationship of attachment security and need satisfaction between individuals across the ten days of measurement. Age and subjective health did not moderate the association between attachment security and any of the three domains of need satisfaction. For complete results see Table 11.

5.4. Discussion

This study examined how momentary attachment security relates to basic psychological need satisfaction in older adults' daily life. Three main findings emerged. First, older adults showed substantial variation in their levels of attachment security over time. Second, momentary attachment security was significantly associated with need satisfaction in the domain of relatedness, autonomy and competence. These within-person associations paralleled those at the between-person level. Third, the strength of this association was not moderated by age or subjective health at the between person level, indicating that on average, the oldest old in the study and those with lower subjective health do not significantly differ from the less old or healthier adults in the degree to which attachment security and need satisfaction are associated. However, subjective health moderated the association between attachment security and autonomy at the within-person level.

Results of the current study confirmed our first hypothesis and indicate that older adults indeed show variation in attachment security within-person while navigating their everyday life. As younger adults show reactivity to varying situations and interpersonal events in their natural life in terms of deviation from their individual means of attachment security (Davila & Sargent, 2003; Gillath et al., 2009), older adults likewise seem to vary around their personal mean of their momentary feeling of being loved and secure within their attachment

relationships. Older adults show substantial deviation from their individual mean levels of attachment security during the course of everyday life.

Even more important than demonstrating variation in older adults' attachment system in daily life, is the fact that the current study demonstrated the adaptive value of increases in momentary attachment security by identifying significant within-person covariation with need satisfaction. Results on systematic within-person covariation of attachment security and need satisfaction confirmed the second hypothesis of the current study. The current findings are in line with La Guardia and colleagues (2004) findings that focused on younger adults. In moments in which older adults exceed their average levels of attachment security, they feel more related to close ones, as well as more autonomous and competent in their actions and behaviors. It is very straightforward that momentary attachment security covaries with relatedness, as the establishment of interpersonal safety and feelings, of comfort, belongingness and comfort are the most prominent function of attachment security (Mikulincer & Shaver, 2007a). In addition, results demonstrated that older adults do not only feel more strongly connected to and close with significant others, but they also feel more independent and self-reliant as well as capable and proficient in everyday situations in moments of increased security. These findings support the notion that attachment-security does not only predict relational and social determinants of well-being such as relatedness (Leak & Cooney, 2001), but instead also facilitates need satisfaction in domains of life that are not primarily social in older adults' daily life such as autonomy and competence.

Different mechanisms may explain why attachment security is related to older adults' sense of competence in everyday life. First, an increased sense of security may raise the likelihood of seeking out mundane challenges and daring to accept demanding tasks of everyday life due to optimistic self-efficacy beliefs. Being especially secure about the

availability and love of an attachment figure should raise the likelihood for an individual to seek out and thus experience situations that promote feeling competent, such as being physically active, participating in community events, volunteering or simply engaging with everyday tasks such as shopping or gardening. Research suggests that attachment security generally leads to exploration, which in turn allows older individuals to do things that increase their feeling of competency (Elliot & Reis, 2003; Feeney & Van Fleet, 2010). In addition, attachment security may also be adaptive to need satisfaction as it may buffer against adverse outcomes. For example, increased attachment security should make it easier for an older individual to accept moments of dependency and the necessity to receive assistance and yet feel competent in achieving a certain outcome (cf. Fiori et al., 2008). Likewise, greater attachment security in a given moment might enable better acceptance of or compensation for age-related decline of competences in certain domains such as memory, motor skills or physical strength. These mechanisms should be tested in future research.

Results of the current study further demonstrated that older adults experience ups and downs in their feelings of autonomy in daily life and that these within-person variations in feelings of autonomy can be predicted by the person's concurrent feeling of attachment security. In moments that individuals feel more secure than they usually do, they also feel more autonomous. Results suggest that older adults gain an increased sense of autonomy by momentary attachment security, not by emotional detachment and distancing from dependency needs. These results are in line with prior theoretical and cross-sectional research on *healthy dependency* and autonomy in late life (Bornstein, 1994; Gardner & Helmes, 2006, 2007). The findings of the current study advance current research by demonstrating pathways, in which attachment security may help older adults to navigate everyday life

without avoiding dysfunctional detachment or destructive overdependence that seems to prevent authentic autonomy (Baltes, 1996; Feeney 2007).

Results further indicated that between-person associations parallel those associations at the within-person level. In other words, older adults who are generally more secure than others in daily life also feel on average more related, more competent, and more autonomous than older adults who are less secure. These between-person associations were not moderated by age or subjective health, disconfirming our third hypothesis of the current study. Results suggested, that the average relationship between attachment security, competence and autonomy can be generalized across younger and older seniors in this sample. Potentially, the age range of the current sample was too narrow as well as health did not show enough variability to detect differential effects in the relationship between attachment security and need satisfaction. However, we found that subjective health moderated the association between attachment security and autonomy at the within-person level. In other words, the momentary coupling of attachment security and momentary autonomy within an individual is slightly more pronounced in those older adults with better health compared to those with lower health status. However, important to mention, these interaction effects are very small in size, as can be seen from Table 2 and Figure 1, and thus need further examination in future studies.

Limitations, Future Directions and Conclusion

The present study is limited in ways that should promote future research. First, as already mentioned, it would be worthwhile to identify events antecedents to older adults' variations in attachment security and analyze if these differ from those events triggering ups and downs in younger adults' attachment security (cf. Davila & Sargent, 2003). In line with that, it would be interesting to identify time-varying contextual factors that may moderate the

within-person association between attachment security and need satisfaction such as interpersonal tension or intrapersonal stress. A second limitation is due to the non-causal design of the study. The intensive-longitudinal design allowed for examination of processes in older adults' daily life and thus heightened the ecological validity of the study. However, as the study is correlational, causal pathways between attachment and need satisfaction cannot be tested. In order to address this limitation, future studies investigating within-person processes related to attachment security should use real-time interventions and manipulate individual's attachment security via priming and observe if these trigger increases in need satisfaction (Davidson, Peacock, Kronish, & Edmondson, 2014).

The current study was able to evidence that attachment security is variable in older adults while processes related to variability in attachment security are important to beneficial outcomes in older adults' everyday life. Similar to research with younger adults, older adults vary in how much they feel loved and safe within their attachment relationships in daily life. It was demonstrated how momentary attachment security is positively related with increased need satisfaction of basic psychological needs in old age. This study shows how secure attachment goes hand in hand with greater autonomy, competence and relatedness in the daily life of older adults and that these associations are given in younger and older seniors and relatively independent from older adults' health status and chronological age. Results suggest the adaptive potential of momentary attachment security, as moments of increased security seem to bring about feelings of being capable, self-determined in one's actions and emotionally close with significant others in older adults. The results of the current study give first evidence that attachment security may affect adjustment and optimal functioning in old age via these pathways of facilitating need satisfaction.

6. Study 4: Intervening on Forgiveness as an Attachment-Related Process

Managing Unresolved Interpersonal Transgressions in Old Age Through Insight and Practice [9]

6.1. Introduction

Forgiveness may play an important role for healthy aging. For example, forgiveness may contribute to social health because it helps to repair and to maintain important social relationships (Fingerman & Charles, 2010). Research has also shown that forgiveness is associated with subjective well-being (Hill, Heffernan, & Allemand, 2015), better mental health (Toussaint, Williams, Musick, & Everson, 2001), better physical health (McFarland, Smith, Toussaint, & Thomas, 2012), and lower mortality risks in old age (Toussaint, Owen, & Cheadle, 2012). Hence, it is not surprising that first efforts have been made to design interventions that focus on forgiveness in old age (Allemand, Steiner, & Hill, 2013; Hebl & Enright, 1993; Ingersoll-Dayton, Campbell, & Ha, 2009). Initial evidence supports the efficacy of these interventions. In addition, several meta-analytic reviews of the efficacy of forgiveness interventions for different target groups but mainly for younger adults have shown that the interventions helped participants to manage experienced transgressions, to decrease negative states such as depression, anxiety, and anger, and to increase positive states such as hope and psychological well-being (Baskin & Enright, 2004; Lundahl, Taylor, Stevenson, & Roberts, 2008; Wade, Hoyt, Kidwell, & Worthington, 2014; Wade, Worthington, & Meyer, 2005). Despite their efficacy, little is known about the mechanisms

[9] A similar version of this chapter has been submitted for publication to "Journal of Counseling Psychology" (Allemand, Martin, & Flückiger).

underlying forgiveness interventions. Hence, in this study we examined the role of two broad pathways in managing unresolved transgressions.

Unresolved Interpersonal Transgressions and Forgiveness in Old Age

Interpersonal transgressions can be defined as a class of interpersonal stressors in which people perceive that another person has harmed them in a way that they consider both painful and morally wrong (McCullough, Root, & Cohen, 2006). Unresolved interpersonal transgressions have the potential to disrupt social relationships and, in some cases, might lead to a combination of delayed negative emotions toward the transgressor such as resentment, hostility, and hatred (Worthington & Wade, 1999). In the long-term, such negative emotional reactions can lead to constant grudges and embitterment, which, in turn, hinder conciliatory behaviors (Linden & Maercker, 2011). The consequences of unresolved transgressions might be particularly adverse in old age. Indeed, research has demonstrated that unresolved transgressions contribute to depressive symptoms in later life (Ingersoll-Dayton, Torges, & Krause, 2010). Research has also shown that older adult who are more willing to forgive others tend to report less depressive symptoms, partly because forgiveness might help to achieve more self-acceptance and less experiences of despair (Dezutter, Toussaint, & Leijssen, 2016). Moreover, as people age they become increasingly concerned with the maintenance of emotionally close relationships and the optimization of the emotional functioning (Carstensen, Isaacowitz, & Charles, 1999; Charles & Carstensen, 2010). Hence, forgiveness can be conceptualized as an adaptive change process that helps people to manage unresolved transgressions and to maintain social and emotional well-being.

According to an influential motivational perspective, forgiveness targets three important transgression-related interpersonal motivations (McCullough, Fincham, & Tsang, 2003): (a) the motivation to avoid the transgressor or stimuli that are associated with the

transgressor and/or the transgression, (b) the motivation to seek revenge, and (c) the motivation to show benevolent motivations toward the transgressor. From this perspective, forgiveness is defined as changes in transgression-related interpersonal motivations (TRIMs) over time, that is, avoidance and revenge decrease over time, whereas benevolence may increase (McCullough et al., 2003; see Worthington, 2005 for other conceptualizations of forgiveness). As a possible result of these motivational changes, maintaining or repairing emotionally close relationship becomes easier and thus stabilizes emotional functioning and social relationships (Baker, McNulty, Overall, Lambert, & Fincham, 2012). It is important, however, to note that motivational changes in the internal state of the offended person do not necessarily translate into a change in the relationship between the hurt person and the transgressor.

Managing Unresolved Interpersonal Transgressions in Old Age

First efforts have been made to design forgiveness interventions specifically for older adults, as the maintenance and promotion of older adults' well-being and health has become an urgent priority in society and research. Because old age brings about its own unique tasks and challenges (e.g., declines in cognitive and physiological functioning, loss of the spouse or other important interaction partners) and individual resources (e.g., life experiences, abilities and competencies, a variety of adaptive behaviors to maintain or improve well-being and health) it is important to take age-specific issues into account in intervention and counseling efforts with older adults (Wong, Hall, Justice, & Hernandez, 2015). However, so far only very few forgiveness intervention and counseling studies have been conducted with older adults and very few have explicitly taken age-specific issues into account (cf. Keum, 2017). To the best of our knowledge, four intervention studies were conducted so far with older adults. The goal of the first forgiveness intervention study was to help older women to

forgive a considerable psychological hurt (Hebl & Enright, 1993). Twenty-four older women with a mean age of 74.5 years participated in either a forgiveness condition or a control condition over 8 weeks. Results demonstrated that participants in the forgiveness condition, relative to the control group, showed significantly higher levels of forgiveness. In both groups, depression and anxiety decreased significantly. The second study examined the applicability of a social work intervention with older adults (Ingersoll-Dayton et al., 2009). Twenty older adults aged between 58 and 82 years participated in two different forgiveness groups, which involved eight sessions with a 4-month follow-up session. The main results indicated that participants experienced long-term improvement with respect to forgiveness and depression and short-term improvement of physical health.

Although these two studies provide initial evidence that forgiveness interventions may prove effective with older adults, they have not explicitly taken age-specific issues into account. The goal of the third study thus was to examine the efficacy of a psycho-educational group intervention designed specifically for older adults (Allemand et al., 2013). The intervention consists of (a) established core components of previous forgiveness interventions (e.g., defining forgiveness and recalling the hurt; Wade & Worthington, 2005) and (b) additional components considering specific needs of older adults (e.g., reflecting and narrating past negative experiences and their consequences). Seventy-eight older adults (mean age 70.1 years) were randomized to a treatment condition or a waiting-list control condition. The intervention significantly reduced the levels of perceived actual transgression painfulness, transgression-related emotions and cognitions, and negative affect. Finally, a group training based on forgiveness, gratitude, and autobiographical memory was developed to increase quality of life of older adults (Ramírez, Ortega, Chamorro, & Colmenero, 2014). Forty-six older adults aged between 60 and 93 years participated in either an intervention

condition or a placebo control condition over nine 1.5-hour weekly group sessions. Participants in the intervention condition showed a significant decrease in state anxiety and depression as well as an increase in specific memories, life satisfaction and happiness as compared with the control group. In sum, the results of the sparse available studies are promising as they suggest that the interventions help older adults managing unresolved transgressions. However, the mechanisms underlying these interventions are largely unclear.

Pathways to Managing Unresolved Interpersonal Transgressions

Different intervention pathways may help people to manage unresolved transgressions. In this study, we compared two broad pathways based on general intervention principles. Integrative treatment paradigms define preconditions and factors that are general across different intervention approaches (Castonguay & Beutler, 2005; Grawe, 2004; Prochaska & Norcross, 2010; Prochaska & Prochaska, 2010; Wampold & Imel, 2015). These paradigms assume that treatment outcomes can be largely explained by shared principles or common factors rather than by specific therapeutic techniques or factors that are unique to specific treatment orientations. Two common factors are learning-oriented versus action-oriented pathways that reflect two basic routes of change (cf. Prochaska & Norcross, 2010; Prochaska & Prochaska, 2010). On the one hand, *learning-oriented* change processes primarily concern cognitive and affective aspects that foster more awareness of a problem, a need, or one's own capability (cf. Allemand & Flückiger, 2017). The primary target of an intervention would be the cognitive-affective or reflective functioning. The goal here is to facilitate experiences of a new understanding, to change maladaptive views of the self, others, and the world, and to increase insight. Such a pathway towards managing unresolved transgressions would primarily promote *insight* by helping people to understand or to affectively re-experience the unresolved transgression in a different and more adaptive way.

On the other hand, *action-oriented* change processes foster active work on the problem, a need, or a personal capability (cf. Allemand & Flückiger, 2017). The primary goal here is to help individuals to learn and to reinforce new behaviors and skills such as compensatory or coping skills and to learn to behave in new social roles and to practice targeted behaviors. Such a pathway toward managing unresolved transgressions would primarily promote *practice* by helping people to practice new behaviors and in order to adaptively manage the unresolved transgression. The two basic routes of change reflect related but distinct general pathways to change.

Both pathways might be effective in dealing with the consequences of being hurt. Wade and Worthington (2005) found six common intervention themes across different forgiveness interventions. Some components refer to reflective strategies that promote learning-oriented change processes such as reflection about experiences and about one's own behaviors and actions in the past. These strategies focus on promoting insight into maladaptive behaviors and their consequences and on clarifying the motivations for changing behavior. Additionally, other components include behavioral strategies such as emotion regulation strategies to cope with a specific negative experience. Learning different coping strategies would be particularly helpful in handling future transgressions. Although previous intervention work on forgiveness typically included strategies that promote both insight and practice (e.g., Wade et al., 2014; Wade & Worthington, 2005), to the best of our knowledge no previous studies tested the comparative effects of these two pathways.

Present Study

The main goal of this study was to compare the effects of learning-oriented versus action-oriented pathways to manage unresolved transgressions in old age. To do so, participants were randomized to either (a) a learning-oriented guided self-help group

intervention condition that emphasizes learning factors by helping older adults to understand or affectively re-experience the transgression in a more adaptive way; or (b) an action-oriented guided self-help group intervention condition that emphasizes action factors by helping older adults to practice new behaviors and skills in order to adaptively manage the transgression. Each condition consisted of three weekly group sessions. We assumed that the learning-oriented condition with a focus on strategies such as clarifying and narrating past interpersonal transgressions and integrating them into a coherent life story are particularly important for older adults (Allemand & Steiner, 2012; Dezutter et al., 2016). The comparative effects of the two pathways were explored with respect to several outcome variables that were used in earlier research including forgiveness, painfulness, anger, humiliation, rumination, subjective well-being, and mental health (e.g., Wade et al., 2014).

6.2. Method

Participants

A total of 86 older adults from Swiss-German speaking-part were recruited on a convenience basis through university database and agencies serving older adults. The focus of the recruitment process was to recruit older adults who are interested to manage an experienced yet unresolved transgression. The inclusion criteria for participating in the study were (a) to have experienced a serious interpersonal transgression that is still unresolved, and (b) to be interested in learning skills that help to manage the unresolved transgression. Exclusion criteria were language skills (unable to participate in a German-speaking group setting). Eleven adults did not fulfill these criteria and were excluded. Seventy-five older adults were randomized to the two conditions, and participated during the three weakly group sessions. Two participants were excluded from the analyses because they did not fill out the questionnaires correctly or did not provide any forgiveness data at all, resulting in a final

sample of $N = 73$, consisting of 39 older adults in the learning-oriented intervention condition and 34 older adults in the action-oriented intervention condition.

The targeted age for the study participation was 60 years and older; however, two persons were slightly younger (the two participants were 57 years old). The mean age was 68.8 years ($SD = 4.8$, range: 57-82 years). The sample was predominantly made up of women (84%), as is often the case with such types of interventions (e.g., Allemand et al., 2013; Wade et al., 2014). With respect to educational attainment, 8.3% reported attending high school as the highest level of education, 41.7% completed a vocational school/apprenticeships, 34.7% completed a technical school or a teacher's training, 8.3% had a university degree, and 6.9% reported other educational qualifications. Regarding marital status, 13.7% of the participants were single, 41.1% were married, 26.0% were either separated or divorced, and 19.2% were widowed. Participants rated their perceived physical health relative to an average person of their age on a scale ranging from 1 (*poor*) to 5 (*excellent*; Idler & Kasl, 1991). Perceived physical health was relatively good ($M = 4.20$, $SD = 0.71$) and was not statistically significantly related to age ($r = -.19$, $p > .10$). All participants were unpaid volunteers, but they received a feedback about the study purpose and the main findings and implications at the end of the study in an organized event for participants.

Procedure and Intervention Pathways

The guided self-help group intervention study was conducted according to the Declaration of Helsinki and in accordance with ethical principles promulgated by the Ethics Committee of the Faculty of Arts and Social Sciences University of Zurich. The randomized design compares two active self-guided group intervention conditions: (a) a learning-oriented condition, and (b) an action-oriented condition. After giving informed consent, participants were randomly assigned to one of the two conditions. Participants in both conditions were

assessed one week before the intervention (T1: pretest), after each weekly group session (T2 to T4), one week after the intervention (T5: posttest), and four weeks after the posttest (T6: follow-up). At pretest (T1), participants in both conditions were instructed to recall a serious interpersonal transgression that is still unresolved and to briefly describe it (e.g., McCullough et al., 1998). Subsequently, participants were asked to answer questions related to the unresolved transgression and then completed a self-report measure of forgiveness (see below) followed by questions related to the transgression and to subjective well-being and mental health. Participants completed the same self-report measures after each session (T2 to T4), at posttest (T5), and at follow-up (T6) four weeks later. The three weekly group sessions with 3.5 hours per session were conducted in six groups with three groups per condition. On average, 12.5 participants (range: 9-16) were in a group. A psychologist with a degree in postgraduate studies in counseling and with ample experiences in counseling with older adults led all group sessions.

The guided self-help group sessions followed an intervention protocol largely based on existing forgiveness interventions (Wade et al., 2014; Wade & Worthington, 2005) and prior work with older adults (e.g., Allemand et al., 2013) albeit with a differential emphasis on the role of learning (insight) and action (practice) factors as two broad pathways in managing unresolved transgressions in old age. More specifically, both conditions had a similar intervention structure with components that are common in forgiveness interventions such as defining forgiveness, recalling the hurt, building empathy, acknowledging one's own offenses, committing to forgiveness and overcoming unforgiveness (Wade & Worthington, 2005). An overview of the intervention structure and the main activities are given in Appendix A. In addition to the similar contents, the conditions clearly differ in the goals and specific intervention components. The goal of the learning-oriented group intervention was

primarily to emphasize learning factors by helping older adults to understand or affectively re-experience the unresolved transgression in a more adaptive way. In contrast, the goal of the action-oriented group intervention was primarily to emphasize action factors by helping older adults to practice new behaviors and skills in order to adaptively manage the transgression. To reach those intervention goals, unique intervention components were used and the respective specific pathway to manage unresolved transgressions were constantly emphasized throughout all group sessions. An overview of the unique components and the related activities is given in Appendix B.

Outcome Measures

Forgiveness. The Transgression-Related Interpersonal Motivations Inventory (TRIM-18; McCullough et al., 2003) was used to assess forgiveness. The seven-item Avoidance subscale measures the motivation to avoid the transgressor (e.g., "I keep as much distance between us as possible"). The five-item Revenge subscale measures the motivation to seek revenge (e.g., "I'll make him/her pay"). The six-item Benevolence subscale measures benevolence motivation toward the transgressor (e.g., "Even though his/her actions hurt me, I still have good will for him/her"). The items were rated using a 9-point Likert-type scale ranging from 0 (*strongly disagree*) to 8 (*strongly agree*). Reliability estimates (Cronbach alpha) across the measurement occasions ranged from .91 to .93 (avoidance); .63 to .82 (revenge); and .87 to .93 (benevolence).

Transgression-related emotions and cognitions. Painfulness was measured with a single item ("I feel a deep hurt when I think of this incident"). Anger (e.g., "I am very angry with him/her") and humiliation (e.g., "I feel embarrassed after this transgression") were measured each with two items. All items items were rated using a 9-point Likert-type scale ranging from 0 (*not at all*) to 8 (*extremely strong*). Following the recommendations by

Eisinga, Grotenhuis, and Pelzer (2013), we estimated split-half reliability estimates (Spearman-Brown) for each of the two-item scales. The estimates ranged from .45 to .78 (anger) and from .62 to .75 (humiliation) across measurement occasions.

Rumination was measured with four items from the Rumination about the Transgression Scale (RTS; McCullough, Orsulak, Brandon, & Akers, 2007; the items were: "Thoughts and feelings about what this person did to me kept running through my head", "Strong feelings about what this person did to me kept bubbling up", "I found it difficult not to think about the hurt that she/he caused me", and "I found myself playing the offense over and over in my mind"). Only half of items of the RTS were used to reduce participant burden. Participants rated how frequently they had each of these experiences using a 6-point Likert-type scale ranging from 0 (*never*) to 5 (*extremely often*). Reliability estimates (Cronbach alpha) across the measurement occasions ranged from .86 to .93.

Subjective well-being. Subjective well-being consists of affective and cognitive components. Positive and negative affect were each measured with six adjectives (positive affect: satisfied, happy, confident, hopeful, active, and energetic; negative affect: disappointed, sad, anxious, worried, sluggish, and exhausted; Allemand et al., 2013). Participants were asked to rate how strongly they felt each affect on average in the *previous days* using 5-point Likert-type scales ranging from 0 (*not at all*) to 4 (*extremely*). Reliability estimates (Cronbach alpha) across the measurement occasions ranged from .79 to .92 (positive affect) and from .78 to .84 (negative affect). The cognitive component of subjective well-being was measured with the Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985; sample items are "In most ways my life is close to my ideal" and "The conditions of my life are excellent."). Participants were asked to rate how strongly they agree with the five items in the *previous days* using 5-point Likert-type scales ranging from 0

(*strongly disagree*) to 4 (*strongly agree*). The internal consistency of the scale at the pretest was low (α = .51) due to the item "If I could live my life over, I would change almost nothing" with a low item-total correlation (r < .10). After dropping this item the reliability was acceptable (α = .65). We thus excluded this item across all measurement occasions. Reliability estimates (Cronbach alpha) for the four-item measure ranged from .65 to .87.

Mental health. Self-reported mental health was measured with a 5-item short version of the Symptom Check List (SCL-5; Tambs & Moum, 1993; sample items are "Feeling hopelessness about the future" and "Worrying too much about things"). Participants rated how distressed they were *in the last days* using 5-point Likert-type scales ranging from 0 (*never*) to 4 (*extremely often*). Reliability estimates (Cronbach alpha) across the measurement occasions ranged from .78 to .85.

Data Analytic Strategy

Longitudinal multilevel models were used to model changes in the outcome variables in response to the two intervention pathways (Bolger & Laurenceau, 2013). The data structure included repeated assessments of the outcome variables (Level 1: time) nested within participants (Level 2: person), and participants nested within groups (Level 3: group setting). Although the focus of the analyses was on Levels 1 and 2, we included Level 3 to account for potential variation between the six groups. A three-level unconditional growth curve model was estimated for each outcome variable to investigate whether scores change significantly over time. Time was scaled such that 0 was the value for pretest and 1 was the value for follow-up (0, .125, .25, .375, .50, 1). This scaling of time implies that a linear slope for time estimates the total change in the repeated outcome variables over the complete assessment period.

To account for different shapes that the growth curve might take, four different unconditional growth curves were fitted to the data, and the best model was obtained by evaluating the relative model fit with the Bayesian Information Criteria (BIC; Pinheiro & Bates, 2000) with smaller values indicating better-fitting models. First, we tested a linear unconditional growth curve with only a linear time term of repeated assessments as the Level 1 predictor to assess the possibility that the scores increase or decrease at a constant rate over time. Second, we tested a logarithmic unconditional growth curve with only a log term of repeated assessments as the Level 1 predictor to assess the possibility that scores decrease or increase at a faster rate during the first measurement occasions then decrease or increase at a slower rate during later assessments. Third, we tested an unconditional quadratic growth curve by adding linear and quadratic terms to the model to assess the possibility that scores first decrease over time and then increase or first increase then decrease. Fourth, we tested an unconditional cubic growth curve by adding linear, quadratic and cubic terms to the model to assess the possibility that scores decrease first over time, then increase before decreasing again or increase first, then decrease before increasing again. In the beginning of the model fitting process, random effects were specified at both Levels 2 and 3. However, when there was an indication that the variances were not properly modeled, the random effects at Level 3 were dropped one by one, until the model fit properly. For these analyses, we used the maximum likelihood (ML) estimator method because ML is required for such model comparisons.

These analyses represented prerequisites for the following main set of analyses. For each best fitting model, a conditional growth curve model was estimated with intervention condition (0 = action-oriented condition, 1= learning-oriented condition) as a Level 2 predictor to investigate whether the change over time differed between the intervention

conditions. For these main analyses, we used the restricted maximum likelihood (REML) estimation method estimator, because it is commonly recommended when the sample size is relatively small (cf. Bolger & Laurenceau, 2013).

6.3. Results

Interpersonal Transgressions

Participants reported a broad variety of transgressions ranging from a lack of parental love during childhood, to being treated unfairly at the workplace, to being disappointed by friends, family, or neighbors. The types of interpersonal transgressions reported were emotional and/or verbal abuse (27.9%), bullying, harassment or lack of appreciation (27.9%), disloyalty or broken commitment (22.1%), inheritance fights (7.4%), violations of trust (7.4%), infidelity (4.4%), and physical or sexual abuse (2.9%). The transgressions have been committed by a family member (38.9%), by a romantic partner (30.6%), by a colleague or a person at work (9.7%), by a friend (8.3%), by an acquaintance or a neighbor (5.6%), or by an unspecified person (7.0%). The transgression had occurred a few days or few weeks ago (18.3%), a few months ago (7.0%), between 1 and 5 years ago (26.8%), between 5 and 10 years ago (18.3%), between 10 and 20 years ago (14.1%), and more than 20 years ago (15.5%). On a Likert-type scale ranging from 0 (*a little bit*) to 8 (*extremely strong*) the transgression has been perceived retrospectively as relatively severe (M = 7.14, SD = 1.39), and as less painful at pretest (M = 4.10, SD = 1.93). On a Likert-type scale ranging from 0 (*not close at all*) to 8 (*very close*) participants indicated that they were not very close with the transgressor at T1 (M = 2.99, SD = 2.84).

As a first step, we compared participants across the two intervention conditions for demographic and background variables and pretest outcome variables to check for potential differences between the two conditions. There were no statistically significant mean-level or

frequency differences across conditions. Consistent with a successful random assignment the two conditions did not differ with respect to demographic variables, type of interpersonal transgressions, type of relationship and closeness with the transgressor, time since the transgression had occurred, perceived transgression severity, and all outcome variables at T1.

Comparative Effects of the Intervention Conditions

Participants provided longitudinal data with respect to the outcome variables, on average with 5.4 repeated assessments (*SD* = 1.2). From 438 potential observations (73 participants × 6 measurement occasions), there were on average 391 observations (89.2%) for the outcome variables. Table 12 presents means and standard deviations for all outcome variables across assessments for both intervention conditions. Three-level unconditional growth curve models with random intercepts and random slopes were first fitted for each outcome variable to model change processes. These initial analyses indicated that the variances at Level 3 were not properly modeled and none of the Level 3 intercept and slope variances were statistically significant, suggesting no meaningful variation at the group level. Not having enough groups relative to parameters may have resulted in problems with convergence of the models and less than ideally reliable estimates of parameters at Level 3. However, because this study focused primarily on analyses at Levels 1 and 2, we dropped random slope and random intercept at Level 3 which then resulted in properly converged two-level growth curve models with a random intercept and a random slope at Level 2. For each of outcome variable, we tested linear, logarithmic, quadratic, and cubic growth shapes as a prerequisite for the main analyses .

Table 12. *Means and Standard Deviations for all Outcome Variables Across Assessments for Both Intervention Conditions*

Outcome	Pretest: T1		T2		T3		T4		Posttest: T5		Follow-up: T6		Test-retest[a]		Effect size[a]	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	$r_{T1,T5}$	$r_{T1,T6}$	$d_{T1,T5}$	$d_{T1,T6}$
Avoidance	3.98 (3.62)	2.32 (2.52)	3.98 (3.57)	2.44 (2.45)	3.90 (3.50)	2.37 (2.47)	3.66 (3.11)	2.27 (2.50)	3.51 (3.28)	2.57 (2.49)	3.78 (3.65)	2.26 (2.37)	.79	.82	0.22	0.01
Revenge	1.36 (1.03)	1.69 (1.67)	1.21 (0.88)	1.98 (1.39)	1.05 (0.75)	1.52 (1.26)	0.64 (0.62)	1.06 (1.01)	0.58 (0.74)	0.84 (1.30)	0.50 (0.96)	0.93 (1.42)	.31 (.35)	.11 (.37)	0.39 (0.15)	0.38 (0.04)
Benevolence	3.57 (4.13)	2.12 (2.40)	3.82 (4.16)	2.54 (2.21)	3.83 (4.17)	2.16 (2.37)	4.07 (4.50)	2.22 (2.48)	4.16 (4.11)	2.41 (2.57)	4.10 (4.39)	2.50 (2.28)	.71	.70	0.16	0.23
Painfulness	4.38 (4.41)	2.62 (2.71)	4.23 (4.45)	2.74 (2.70)	3.90 (4.15)	2.74 (2.51)	3.38 (3.31)	2.56 (2.46)	3.62 (3.06)	2.44 (2.47)	3.32 (2.97)	2.39 (2.46)	.71	.70	0.53	0.61
Anger	2.96 (2.27)	2.32 (2.00)	2.60 (2.20)	2.12 (2.02)	2.58 (1.84)	1.94 (2.01)	2.26 (1.64)	1.68 (1.62)	2.07 (1.63)	1.87 (1.89)	1.70 (2.16)	1.58 (2.39)	.62	.33	0.41	0.26
Humiliation	4.05 (3.74)	2.32 (2.80)	4.02 (3.26)	2.09 (2.61)	3.67 (3.29)	2.11 (2.53)	3.52 (3.15)	2.17 (2.66)	3.17 (2.68)	2.00 (2.63)	2.98 (2.86)	2.05 (2.13)	.75	.60	0.54	0.42
Rumination	2.17 (1.83)	1.27 (1.22)	2.02 (1.61)	1.05 (0.89)	1.87 (1.41)	1.00 (0.84)	1.57 (1.32)	1.03 (1.01)	1.19 (1.07)	0.83 (0.97)	0.91 (0.82)	0.54 (0.72)	.46	.35	0.66	0.79
Positive affect	2.75 (2.76)	0.52 (0.59)	2.69 (2.74)	0.63 (0.78)	2.70 (2.74)	0.74 (0.63)	2.69 (2.84)	0.59 (0.72)	2.93 (2.82)	0.55 (0.64)	2.86 (2.89)	0.58 (0.59)	.60	.53	0.22	0.21
Negative affect	1.13 (1.11)	0.73 (0.60)	1.03 (0.89)	0.69 (0.66)	1.01 (0.93)	0.79 (0.64)	0.91 (0.87)	0.70 (0.72)	0.79 (0.82)	0.72 (0.51)	0.77 (0.97)	0.66 (0.57)	.75	.64	0.73	0.47
Life satisfaction	2.74 (2.86)	0.43 (0.52)	2.73 (2.85)	0.44 (0.55)	2.81 (2.87)	0.56 (0.56)	2.73 (2.90)	0.58 (0.46)	2.79 (2.84)	0.53 (0.53)	2.91 (2.96)	0.55 (0.50)	.68	.72	0.03	0.36
Psychological distress	0.98 (0.83)	0.85 (0.66)	1.12 (0.99)	0.82 (0.71)	0.97 (0.78)	0.75 (0.65)	0.76 (0.69)	0.75 (0.58)	0.67 (0.62)	0.71 (0.56)	0.71 (0.66)	0.67 (0.68)	.68	.63	0.43	0.34

Note. Descriptive statistics are shown for the action-oriented condition (n = 34) and in brackets for the learning-oriented condition (n = 39). [a] Due to the fact that the condition by slope interaction was not statistically significant for any of the outcome variables except for revenge (see Table 11), test-retest correlations and effect sizes were not calculated separately for both conditions except for revenge. The effect size measure used here was a standardized mean difference and was calculated by subtracting the mean of the T2 scores from the mean of the T1 scores and dividing this raw mean difference by the standard deviation of the raw scores at T1 and taking the correlation between the pre- and posttest into account (single-group, pretest-posttest raw score effect size; Morris & DeShon, 2002).

For the main analyses, a series of two-level conditional growth curve models with intervention condition as a Level 2 predictor were estimated. The inclusion of linear and/or nonlinear terms in these models were based on the prior analyses. Because the main goal of the study was to explore whether there was a significant difference in the rate of change of the outcome measures over time between participants in the two intervention conditions, in reporting results we focus on the *fixed effects* (i.e., intercept, slope, intervention condition by slope) only. Tables 11 and 12 presents the estimates and confidence intervals for the fixed effects of the conditional growth curve models. As expected, there was no significant intervention condition differences in average initial levels (i.e., intercepts) of all outcome variables. For example, participants in the action-oriented condition on average showed an initial level of 4.08 units on a 0-8 scale for avoidance and the learning-oriented condition showed a slightly lower initial level of 3.64 (4.08 + [-0.44]). However, this intercept difference was not statistically significant.

Results from Tables 13 and 14 indicate that were no significant intervention condition differences in average change levels (i.e., slopes) with respect to all outcome variables over the two months of data collection with the one exception of revenge. As an example, change in avoidance is characterized by linear and quadratic slopes, suggesting that the shape of change was not strictly linear. In the quadratic model, the term for linear change was negative (action-oriented condition = -1.87; learning-oriented condition = -1.87 + 0.66 = -1.21), suggesting participants tended to become less avoidant over time, but the term for quadratic change was positive (action-oriented condition = 1.66; learning-oriented condition = 1.66 + [-0.72] = 0.94), suggesting that the rate of change in avoidance itself became smaller with the passage of time. The slope differences due to condition, however, were not statistically significant. The only significant condition by log slope interaction was evidenced for revenge

(Table 11). The action-oriented condition showed a logarithmic decrease in revenge over time, whereas participants in the learning-oriented condition only showed a small decrease (action-oriented condition = -1.34; learning-oriented condition = -1.34 + 1.19 = -0.15). The 1.19 unit slope difference due to condition was significant ($p < .05$).

Results from Tables 13 and 14 suggest that on average participants in both conditions showed statistically significant decreases in avoidance, painfulness, anger, humiliation, rumination, negative affect, and increases in benevolence and life satisfaction irrespective of the condition. The shapes of change were mostly characterized by the logarithmic function, suggesting that scores decrease or increase at a faster rate during the first measurement occasions then decrease or increase at a slower rate during later assessments.

Finally, as can be seen from Table 14, psychological distress showed the most complex change pattern over time. In general, participants were, on average, mentally healthy as measured with the short SCL-5. Participants in the action-oriented condition showed an average initial level of 1.00 units on a 0-4 scale for psychological distress and the learning-oriented condition showed a slightly but not statistically significant lower initial level of 0.85 (1.00 + [-0.15]). However, despite the relatively low scores in psychological distress, participants showed decreases over time in terms of quadratic and cubic effects. This suggest that participants in both conditions slightly increased first, then decreased before slightly increasing again.

In sum, both intervention pathways appear to have significantly helped older adults deal with negative states but also increased some positive states. In terms of effect sizes, we found small to medium effects of the participation in both conditions. The pre-posttest and pre-follow-up correlations and effect sizes were depicted in Table 12.

Table 13. *Fixed Effects Parameter Estimates for the Conditional Growth Curve Models for Forgiveness and Transgression Outcome Variables*

	Forgiveness			Transgression-related emotions and cognitions			
	Avoidance	Revenge	Benevolence	Painfulness	Anger	Humiliation	Rumination
Intercept							
Estimate (*SE*)	4.08 (0.42)**	1.26 (0.26)**	3.55 (0.39)**	4.30 (0.41)**	2.84 (0.33)**	4.01 (0.40)**	2.17 (0.17)**
95% CI	3.25; 4.92	0.77; 1.75	2.77; 4.33	3.48; 5.12	2.20; 3.49	3.20; 4.82	1.83; 2.52
Linear slope							
Estimate (*SE*)	-1.87 (0.81)*	--	2.15 (0.83)*	--	--	--	--
95% CI	-3.46; -0.29	--	0.51; 3.79	--	--	--	--
Log slope							
Estimate (*SE*)	--	-1.34 (0.43)**	--	-1.88 (0.73)*	-1.79 (0.57)**	-1.56 (0.54)**	-1.92 (0.28)**
95% CI	--	-2.21; -0.48	--	-3.35; -0.41	-2.93; -0.64	-2.64; -0.47	-2.48; -1.36
Quadratic slope							
Estimate (*SE*)	1.66 (0.75)*	--	-1.65 (0.76)*	--	--	--	--
95% CI	0.18; 3.14	--	-3.15; -0.15	--	--	--	--
Condition[a]							
Estimate (*SE*)	-0.44 (0.58)	-0.35 (0.34)	0.52 (0.54)	0.24 (0.57)	-0.70 (0.44)	-0.52 (0.56)	-0.40 (0.24)
95% CI	-1.58; 0.71	-1.03; 0.32	-0.55; 1.60	-0.89; 1.37	-1.60; 0.19	-1.63; 0.60	-0.88; 0.08
Condition[a] by linear slope							
Estimate (*SE*)	0.66 (1.10)	--	-1.96 (1.14)	--	--	--	--
95% CI	-1.50; 2.81	--	-4.21; 0.28	--	--	--	--
Condition[a] by log slope							
Estimate (*SE*)	--	1.19 (0.59)*	--	-0.75 (0.99)	1.29 (0.78)	0.29 (0.75)	0.46 (0.38)
95% CI	--	0.01; 2.37	--	-0.89; 1.37	-0.27; 2.84	-1.20; 1.78	-0.30; 1.22
Condition[a] by quadratic slope							
Estimate (*SE*)	-0.72 (1.02)	--	1.92 (1.04)	--	--	--	--
95% CI	-2.73; 1.29	--	-0.13; 3.98	--	--	--	--

Note. [a]0 = action-oriented condition (n = 34), 1 = learning-oriented condition (n = 39); *p < .05, **p < .01.

Table 14. *Fixed Effects Parameter Estimates for the Conditional Growth Curve Models for Subjective Well-Being Outcome Variables*

	Subjective well-being		Mental health	
	Positive affect	Negative affect	Life satisfaction	Psychological distress
Intercept				
Estimate (*SE*)	2.70 (0.10)**	1.10 (0.10)**	2.23 (0.08)**	1.00 (0.12)**
95% CI	2.50; 2.90	0.89; 1.32	2.57; 2.89	0.75; 1.25
Linear slope				
Estimate (*SE*)	--	--	--	1.07 (0.70)
95% CI	--	--	--	-0.30; 2.44
Log slope				
Estimate (*SE*)	0.25 (0.14)	-0.48 (0.14)**	0.25 (0.09)**	--
95% CI	-0.04; 0.54	-0.75; -0.20	0.06; 0.44	--
Quadratic slope				
Estimate (*SE*)	--	--	--	-5.82 (2.06)**
95% CI	--	--	--	-9.88; -1.876
Cubic slope				
Estimate (*SE*)	--	--	--	4.47 (1.44)**
95% CI	--	--	--	1.64; 7.30
Condition[a]				
Estimate (*SE*)	0.03 (0.14)	-0.12 (0.15)	0.12 (0.11)	-0.15 (0.17)
95% CI	-0.24; 0.30	-0.41; 0.17	-0.10; 0.34	-0.49; 0.18
Condition[a] by linear slope				
Estimate (*SE*)	--	--	--	-0.02 (0.94)
95% CI	--	--	--	-1.87; 1.83
Condition[a] by log slope				
Estimate (*SE*)	0.01 (0.19)	0.27 (0.19)	-0.10 (0.13)	--
95% CI	-0.38; 0.40	-0.10 (0.65)	-0.35; 0.16	--
Condition[a] by quadratic slope				
Estimate (*SE*)	--	--	--	0.64 (2.78)
95% CI	--	--	--	-4.85; 6.12
Condition[a] by cubic slope				
Estimate (*SE*)	--	--	--	-0.55 (1.94)
95% CI	--	--	--	-4.38; 3.27

Note. [a]0 = action-oriented condition (n = 34), 1 = learning-oriented condition (n = 39); *p < .05, **p < .01.

6.4. Discussion

In this paper, we tried to contribute to scientific progress on forgiveness intervention in two ways that should be of value to counseling researchers: (a) providing further empirical evidence that helping older adults to manage unresolved transgressions is effective, and (b) demonstrating that both learning-oriented versus action-oriented pathways in managing unresolved transgressions in old age are effective pathways.

Participation in three guided self-help group sessions was effective for multiple outcome variables that were assessed six times across a period of two months. Participants became less motivated to avoid the transgressor and to seek revenge (only those participants in the action-oriented condition) and more motivated to show benevolence toward the transgressor. Participation in the group sessions was also effective to reduce negative states such as painfulness, anger, humiliation, rumination, negative affect, and psychological distress, despite the fact that the stress and negative affectivity levels at pretest were already low to moderate. It is worth noting that participation in the group sessions was not only effective in "attenuating the bad" but was also effective in enhancing positive states as indicated by increases in benevolence and satisfaction with life. One of the challenges in old age is to accept life on its own terms. This challenge might reflect an accumulation of life events including interpersonal transgressions and the ability to deal with or accept issues affecting one's life or the lives of others. Old age is an appropriate time to understand life events, why and how they happened, and learn to accept life in a positive manner that will contribute to well-being of the individual and others (Wong et al., 2015). From this perspective, helping older adults to manage unresolved transgressions can be seen as an important strategy to support healthy aging. Although counseling psychologists call for more empirical attention on older adults, older adults are clearly underrepresented in counseling

research (Keum, 2017). The present study explicitly focused on this underrepresented population. Moreover, the findings contribute to the few existing studies testing the efficacy of forgiveness interventions for older adults (Allemand et al., 2013; Hebl & Enright, 1993; Ingersoll-Dayton et al., 2009).

The results of this study demonstrated that both broad intervention pathways were effective in managing unresolved transgressions in old age. The guided self-help group setting with the goal of either (a) helping older adults to understand or affectively re-experience the transgression in a more adaptive way, or (b) helping older adults to practice new behaviors and skills in order to adaptively deal with the transgression produced equivalent outcomes. These present findings remind about the controversially discussed topic of "Dodo bird verdict" in counseling and psychotherapy. This topic claims that all psychotherapies are of broadly similar efficacy, regardless of their specific components (Budd & Hughes, 2009; Luborsky et al., 2002). The finding of equivalent efficacy in the present study raises questions about the potential shared principles or common factors that may had produced the similar findings between the two conditions. One obvious common factor that was shared by both conditions relates to the fact that the same psychologist guided the self-help group sessions. Moreover, although the two conditions clearly differ with respect to the goals and specific components, both conditions also share a similar intervention structure with components that are common in forgiveness interventions (Wade & Worthington, 2005). In fact, in the group sessions it is rather difficult to strictly focus on either learning-oriented processes or action-oriented processes. The only significant interaction effect tends to suggest that participants in the action-oriented condition showed a stronger decrease in motivation to seek revenge than in the learning-oriented condition. Future studies may test whether helping older adults to practice new behaviors and skills is

more effective than emphasizing the role of learning to understand or to affectively re-experience the unresolved transgression in a more adaptive way.

Some limitations of the present study have to be noted. First, our sample had an overrepresentation of female participants. Difficulties in recruiting men for forgiveness intervention studies are a common problem that needs more attention in future intervention studies. Second, the sample consisted of healthy and highly motivated older adults. These resources may enhance the capacity and the willingness to forgive. Future studies may include more heterogeneous samples of older adults in terms of level of distress. Finally, all guided self-help group sessions in both conditions were led by one psychologist. Future intervention studies should include more psychologists (e.g., Baldwin & Imel, 2013).

To conclude, both guided self-help group intervention conditions with three weekly sessions appear to have significantly helped older adult to deal with negative states and to enhance positive states. In this respect, we have preliminary empirical evidence that promoting insight and promoting practice are two valuable pathways in order to manage unresolved transgressions in old age.

7. General Discussion

The goal of this thesis was to use concepts and findings from attachment research to illuminate and understand the role of attachment security as a resource for healthy aging, both in terms of a generalized and internalized feeling of security (Study 3) as well as a characteristic of a specific relationship (Study 1 & 2). While Studies 1 to 3 examined attachment-processes under natural conditions, Study 4 addressed the effects of intervening on forgiveness as an attachment-related process and how older adults may benefit from this intervention in terms of well-being and mental health.

7.1. Summary of Findings

Study 1 examined longitudinal and dyadic associations between romantic attachment and dispositional forgiveness in romantic relationships. Cross-lagged effects and correlated change in dispositional forgiveness and attachment were examined across a one-year period with two measurement occasions (N = 514 individuals). Dyadic analyses were conducted with a subsample of dyads in the study. Individual level analyses revealed negative cross-sectional and longitudinal associations between attachment anxiety and dispositional forgiveness. Attachment and dispositional forgiveness showed significant correlated changes over time. Dyadic level analyses showed that attachment avoidance predicted partner dispositional forgiveness one year later but not vice versa. Findings suggest that longitudinal associations between attachment and dispositional forgiveness seem to take on different forms in the individual as they do in dyads. To gain greater understanding of the relationship processes associated with relationship maintenance behaviors such as forgiveness in romantic couples, it seems important to clearly distinguish individual and dyadic perspectives for both research and practice (e.g., couples therapy).

Study 2 examined associations between individual differences in romantic attachment and transgression frequency and reactions in daily life. Data from both members of the heterosexual relationship was collected to examine how a persons' attachment orientation influenced their own and their partner's perceived transgressions and reactions to these transgressions. Across ten days, one hundred thirty-nine heterosexual couples reported on perceived transgressions by their partner. If transgressions occurred, they also reported on subsequent reactions such as forgiveness and rumination. Actor-Partner Interdependency Models (APIMs) were used to investigate actor and partner effects of attachment anxiety and attachment avoidance on the number of experienced transgressions and reactions to transgressions. Attachment anxiety was not predictive with respect to any of the outcomes of interest. Higher attachment avoidance predicted fewer transgressions and more revenge in reaction to transgressions in men, but not in women. Higher levels of attachment avoidance predicted more avoidance and rumination following a transgression. Additionally, a partner effect from attachment avoidance to avoidant reaction was observed.

Study 3 examined attachment processes in daily life of healthy older adults, as attachment security has been related to need satisfaction, which in turn represents a constitutive ingredient of well-being. This study aimed at investigating momentary attachment security in older adults and how it relates to momentary need satisfaction in a sample of 136 older adults (age range from 60 to 90 years, age_M = 70.45 years) across ten days with two measurement occasions per day in a smartphone-based ambulatory assessment paradigm. Three main findings emerged. First, older adults showed significant within-person variation in attachment security and need satisfaction in terms of relatedness, autonomy, and competence. Second, attachment security covaried with need satisfaction at the within-and between-person level. Third, subjective health moderated this association between attachment

security and autonomy at the within-person level, indicating that attachment security is less related to autonomy when health status low. Age did not moderate any associations between attachment security and need satisfaction at the within- and between-person level. This study extended prior retrospective research by showing that variations of momentary attachment security are relevant for processes facilitating the satisfaction of basic psychological needs in older adults' daily life.

Study 4 examined the general effectiveness of a forgiveness intervention for older adults to promote well-being and health. Specifically, the role of learning-oriented versus action-oriented pathways in managing unresolved interpersonal transgressions (e.g., interpersonal stressors) in old age. Seventy-three older adults (mean age 68.8 years) were randomized to either (a) a learning-oriented guided self-help group intervention condition that emphasizes learning factors by helping older adults to understand or affectively experience the transgression in a more adaptive way, or (b) an action-oriented guided self-help group intervention condition that emphasizes action factors by helping older adults to practice new behaviors and skills in order to adaptively deal with the transgression. The findings of longitudinal multilevel models indicated that both intervention conditions resulted in decreases in avoidance, revenge, transgression-related emotions and cognitions, negative affect, psychological distress, and increases in benevolence and life satisfaction. The results of this study demonstrated that both broad intervention pathways were equally effective in managing unresolved transgressions in old age. Previous research indicates that attachment security and attachment related processes may moderate the general effectiveness of the forgiveness intervention presented in Study 4 (Martin, Steiner, & Allemand, 2015). Taking two participants of this intervention into perspective, Martin and colleagues (2015) elaborated on intrapersonal processes departing from attachment security, which may moderate the

effects of the forgiveness intervention within a person. It seems that relational skills which are key to forgiveness as it takes place in people's natural life also lay the ground for the degree to which individuals can profit from a short forgiveness intervention to maintain or even improve well-being and health. As demonstrated in the two case studies, these relational skills (e.g., perspective taking, building empathy or holding optimistic and benevolent expectations about self and other when self-disclosing on hurt feelings) seem to affect how strongly individuals can take advantage of the intervention.

Taken together, results of the studies provide first evidence that attachment security functions as a personal and dyadic as well as a stable and dynamic resource to enhance micro- and macro-longitudinal processes of healthy aging. Being more securely attached in the moment and across time predicts enhanced engagement in relationship maintenance strategies such as forgiveness and increased need satisfaction, as Studies 1 to 3 have shown. In turn, overcoming transgressions through forgiveness improves well-being and health in older adults as Study 4 evidenced.

7.2. Attachment as Personal and Social Resource

Findings of the present thesis indicate that attachment security affects processes of healthy aging in social and non-social life domains. Results suggest that attachment security underpins processes of healthy aging both as personal and social resource.

First, this thesis demonstrated how attachment security is related to forgiveness at the interpersonal level and thus, functions as a resource for social adaption. In romantic couples, attachment security (as an individual's relative absence as attachment avoidance) predicts the tendency to forgive and, above and beyond, to be forgiven. Bidirectional effects in dyads highlight how attachment security functions as a resource to adaption in relationships. As such, the Studies 1 and 2 of this thesis demonstrated how attachment security in one partner

shapes reactions towards the other partner across time and thus, functions as a dyadic resource fostering positive reciprocity in couples. Study 1 and 2 investigated how attachment security can function as a resource within the individual, but also within romantic pair bonds, which are one of the most important developmental contexts of adult life and, as a close and meaningful bond, a factor most vital to well-being in old age (English & Carstensen, 2014). Studies 1 and 2 expanded current research in evidencing longitudinal, bidirectional effects between attachment security and forgiveness in romantic partners. To be more specific, the thesis found that partner attachment security in terms of relatively low avoidance predicts higher forgiveness in terms of (a) a general tendency to forgive him or her across situations, and, (b) with regard to specific transgressions and as an immediate reaction to cope with these transgressions in romantic partners' daily life. Being relatively securely attached does not only raise the likelihood of displaying forgiveness when feeling hurt by one's partner but also predicts a higher likelihood of being forgiven for one's flaws and failures in a relationship. Results of this thesis suggest that attachment security and forgiveness co-develop in middle aged and older adults. Hence, in old age, couples may benefit from the positive and benevolent couple dynamics that helped maintain a high-functioning and rewarding relationship. Results of this thesis support prior findings on the importance of attachment security in each of the two partners of a dyad to sustain relational well-being, both in the short- and long-term (Arriaga, Kumashiro, Simpson, & Overall, 2017; Overall & Simpson, 2015).

Study 3 captured attachment in its dimension as a social resource with a different methodological and conceptual approach. Study 3 assessed how attachment relates to social well-being in terms of relatedness to close others. Findings of Study 3 evidenced that older adults who are generally secure report higher average levels of relatedness than those

individuals who are less secure. Similarly, when zooming in on the momentary fluctuations of attachment security in a particular individual in daily life, moments of feeling more securely attached than usually go along with feeling more satisfied in being related with significant others. From a different angle, these results demonstrate how attachment security is a correlate of social and relational well-being.

Second, this thesis demonstrated how attachment security is related to non-social domains of functioning in old age, namely an individual's need satisfaction in feeling autonomous and competent (cf. Study 3). It thus functions as a resource for personal adaption. Study 3 examined how attachment security is linked with determinants of well-being in old age apart from regulating interpersonal ties and social connectedness. Results of Study 3 provide first evidence that attachment security in old age is strongly related to aspects of functional ability that are not primarily social but personal. This could also be demonstrated in Study 4, indicating that, on average, participating in a forgiveness intervention helped older adults to overcome past transgressions and served their overall well-being in terms of a decrease in negative affect and psychological distress, and an increase in benevolence and life satisfaction. These effects were not moderated by the intervention's conditions (learning-oriented vs. action-oriented approach) but most likely by individuals' generalized beliefs on self and other and their habitual strategies on how to feel, think and act in relationships, as the observation of participants during the study have shown (Martin et al., 2015). Case studies of two individuals of Study 4 demonstrated that relational skills, strongly linked to a person's general attachment security, are important preconditions that facilitate or hinder forgiveness. Among these relational skills are a person's ability to empathize with someone else, to be able to take another person's perspective, to self-disclose and to have a generally optimistic belief on this persons' understanding, interest and good-

will. As could be seen from the intervention, participants differed strongly in how far they were able to engage in forgiveness due to these factors. These results from the case studies (Martin et al., 2015) converge with those from the literature examining processes of mediation between attachment security and forgiveness (e.g., Kimmes & Durtschi, 2016; Mikulincer et al., 2006). In sum, the results of this thesis suggest that both in individuals' natural life (Study 1 to 3) as well as during interventions (Study 4), both proximal and distal processes rooted in attachment security enable well-being inside and outside of relationships and thus, function as resource to meet personal and social goals.

7.3. Attachment as Stable and Dynamic Resource

Attachment security has both stable *and* dynamic properties (Fraley, 2002; Fraley & Roberts, 2005). Recent research has shown, that even though substantial fluctuations in an individuals' mean level of attachment security can be found across different relationships (Hudson, Fraley, Chopik, & Heffernan, 2015; La Guardia et al., 2004), situations (Davila & Sargent, 2003) and times (Zhang & Labouvie-Vief, 2004), there seems to be a stable latent factor underlying attachment security (Fraley et al., 2011). Models that account for both stable and dynamic properties of attachment are superior in predicting prospective states of attachment than those models that rely solely on prior states of attachment security (cf. Fraley et al., 2011). Although attachment security varies across time and situations within an individual, underlying these variations are relatively stable dispositions, a property of attachment security that appears to undergird its variations across time (cf. Fraley et al., 2011; Gillath et al., 2016). This thesis examined attachment security both as a dynamic and stable resource.

This thesis demonstrated that attachment security, captured as a stable disposition, is related to a stronger tendency to forgive across time. Studies 1 and 2 indicate that individuals

who are securely attached at the dispositional level are more forgiving towards one's partner, both on a dispositional level and in one's actual forgiving reactions towards experienced transgressions in daily life. Similarly, Studies 1 and 2 also demonstrate partner effects of attachment security on forgiveness.

Besides examining the predictive value of attachment security as a stable disposition, this thesis also examined the effects of state attachment security. Conceptualizing attachment security as a state and thus as dynamic resource demands the statistical modeling to be altered from capturing macro- to micro-longitudinal processes. In line with that, statistical modeling is moved from analyzing between-person differences in development towards analyzing within-person processes in everyday functioning (Hamaker, 2012). This is important as within-person associations are statistically and functionally independent from between-person associations of the same construct (Nesselroade, 2001). In other words, averaging summary statistics on a certain phenomenon across individuals may not necessarily yield valid results about how this phenomenon is organized within each individual in a population. Results at the population level do not necessarily reflect within-person processes, such that generalizations from the population to the individual may be biased or even incorrect (Hamaker, Dolan, & Molenaar, 2005; Molenaar, 2004). Study 3 demonstrated that in older adults' daily life, momentary attachment security covaries with need satisfaction *within* individuals. As such, within-person association in attachment security and need satisfaction parallel between-person differences. Not only do individuals who are generally more secure feel more satisfied in their basic needs, but irrespective of that, individuals experience more relatedness, more competence and more autonomy when they experience greater security than they usually do. This is especially interesting as the meaning and valence of momentary increases in state attachment insecurity in old age were less clear in advance. A wide array of

research, not rooted in attachment theory but in theories on lifespan development of affect and motivation, have emphasized that older adults, more than younger adults, regularly engage in avoidant emotion regulation strategies (Birditt, Fingerman, & Almeida, 2005; Blanchard-Fields, Mienaltowski, Seay, 2007). Studies have shown that older adults employ more avoidant and passive strategies (such as walking away from a situation or ignoring a conflict), in order to efficiently regulate distress in daily life (Carstensen et al., 2003; Nikitin, Schoch, Freund, 2014; Charles, Piazza, Luong, & Almeida, 2009). Similarly, older adults report significantly higher states of avoidance than younger individuals in their daily lives (age ranged from 20 to 70 years; Trentini, Foschi, Lauriola, & Tambelli, 2015). In fact, it might have been predicted that being more avoidant at times with regard to attachment may not necessarily reflect dysregulation, but constructive age-graded emotion regulation in older adults. However, results of Study 3 indicated that this is not the case. It is attachment security that dynamically coincides with primary sources of well-being in daily life, not attachment avoidance.

In summary, results of Studies 1 to 3 indicate the adaptive value of attachment security at the within- and between-person level. Both as a stable between-person characteristic as well as within-person dynamic process, attachment security is positively associated with core ingredients of well-being in middle and old age.

7.4. Strengths, Limitations and Future Research Directions

A clear strength of this thesis is the chosen methodological approach. All four studies applied micro- or macro-longitudinal designs, as only longitudinal research approaches are able to depict what is of interest for this thesis, namely processes unfolding across time that enable healthy aging. These processes related to attachment security were examined in four distinct samples with remarkable sample size in terms of participants and measurement

occasions. Further, the thesis made use of various modeling approaches, including longitudinal structural equation modeling, dyadic modeling approaches and multilevel modeling. In doing so, these processes could be examined at the intra- and interpersonal level as well as with regard to within-and between-person associations. Taken together, this thesis integrated different research designs and theoretical foci to better understand attachment-related processes contributing to healthy aging.

Next to several strengths of this thesis, some caveats should be mentioned. First, the research designs of Studies 1 to 4 could have been even better integrated. In order to generate an integrated understanding of how attachment security fosters healthy aging in terms of long-term developmental change and short-term dynamic processes, trait-state models such as the prototype model (Fraley et al., 2011; Hamaker, Nesselroade, & Molenaar, 2007) or the measurement burst design (Nesselroade, 1991; 2001) should be used in future studies. The measurement-burst design involves longitudinal assessments that are planned around closely spaced successive "bursts" of assessments, rather than widely spaced successions of single time point assessments (Nesselroade, 1991). It could combine features of intensive short-term longitudinal methods (cf. Study 3) with features of long-term longitudinal designs (cf. Study 1) that are used for tracking individuals over relatively long time intervals. Therefore, the measurement-burst design can be seen as a hybrid of the two types of longitudinal research designs in order to improve the detection of health-related long-term change and short-term fluctuation and allow for simultaneous examination of both components into a single study (Sliwinski, 2008).

Second, the processes of forgiveness and need satisfaction examined in this thesis are important, as they mark two central mechanisms accounting for health and well-being in old age. However, these are only two of a wide variety of potential pathways via which

attachment security may affect healthy aging, including psychophysiological processes. For example, attachment is robustly linked to health outcomes via physiological processes such as neuroendocrine responses to stress or autonomous nervous system functioning (Diamond & Hicks, 2004 for a review; Robles & Kane, 2014). Future research on the role of attachment security for healthy aging may address these processes more thoroughly and holistically (cf. Pietromonaco, Uchino, & Dunkel Schetter, 2013).

Third, an important limitation of this thesis, and at the same time an important venue for further research concerns the measurement of momentary attachment security and its functionality for healthy aging. Measuring attachment as a dynamic resource should profit from assessing more diverse and detailed information about the context and situation in which momentary attachment security is sampled. Although results of Study 3 indicate a general trend of the beneficial effects of moments of increased attachment insecurity, this does not necessarily hold true for each and every situation of older adults' daily life. Under certain conditions, attachment insecurity may come with an adaptive advantage (cf. Ein-Dor, Mikulincer, Doron, & Shaver, 2010). As one aspect of personality, attachment security is context-dependent and consists of situation-based contingencies (cf. Allport, 1937; Conner et al., 2009). Bowlby (1969, 1988) used a cybernetic framework to explain how attachment behavior is organized, which contexts naturally activate and deactivate the attachment system and, how every individual exhibits signs of insecurity at times. Individuals adjust their attachment-related behavior according to the situation they find themselves in. In order to further understand the adaptive value of attachment security in daily life, it is necessary to measure context in a fine-grained manner in order to produce individualized *behavior profile signatures*, indicating how strongly variations in attachment security converge with certain types of situations or relational partners (cf. Fournier, Moskowitz, & Zuroff, 2009). Likewise,

to further explore the causal role of attachment security, the longitudinal-correlational examinations of attachment security and aspects of functional ability could be expanded into ecological momentary interventions, comprising an active variation of an individual's attachment security in real-time (cf. Heron & Smyth, 2010). In n-of-1 trials it could be examined, whether forgiveness or need satisfactions as aspects of functional ability might increase in moments when attachment security would be randomly increased via security-priming (cf. Davidson et al., 2017). Findings from a within-person-intervention study could corroborate findings of this thesis in understanding attachment security as a resource for healthy aging.

7.5. Outlook: Attachment Theory and Research within the Concept of Healthy Aging

Ultimately, this thesis aims to offer a perspective on how future psychological aging research could benefit from drawing on attachment theory and research. First, aging research could be moved forward by integrating attachment theory into existing and well established theories of aging. Second, ideas on psychological functioning formulated by attachment theory as a psychodynamic theory in combination with advanced modeling approaches such as dynamic system modeling may allow for empirical examination of hypotheses on dynamic processes of healthy aging generated from a thoroughly elaborated theoretical tenet.

7.5.1. Attachment Theory as a Macro-Longitudinal Theory of Healthy Aging: Integrating Normative and Differential Aspects of Development

Until now, attachment theory is not widely recognized as a theory of aging (cf. Bengston, Gans, Pulney, & Silverstein, 2009; Van Assche et al., 2013). Despite its relevance as a developmental theory, attachment theory did not belong to the group of those macro-longitudinal theories with a special focus on developmental changes that occur in late life, such as the theory of Strength and Vulnerability Integration (SAVI; Charles & Piazza, 2009),

the model of selection, optimization and compensation (SOC; Freund & Baltes, 2002), the life-span theory of control (Heckhausen & Schulz, 1995), the two process model of assimilation and accommodation (Brandtstädter & Renner, 1990), or the theory of socioemotional selectivity (SST; Carstensen et al., 1999). However, examining aging processes from an attachment theoretical perspective may advance some tenets of these theories.

First, normative development in socio-affective aging processes could be examined through the lenses of attachment theory. Generally, empirical studies indicate a shrinking network size as people age, with an active and self-selected reduction of peripheral and casual relational partners. A solid core of emotionally meaningful relationships with close friends and family is usually retained (Antonucci et al., 2004). Socio-emotional selectivity theory (Carstensen et al., 1999; Carstensen, Fung, & Charles, 2003) assumes that these developments are self-selected and actively support well-being in older adults. Viewing these characteristics of older adults' social world from an attachment perspective, it could be said that compared to middle and young adulthood, older adults' social world is primarily made up from attachment figures, making attachment-related functioning in old age especially important. Furthermore, this development could be viewed as a prioritization of attachment bonds in old age, suggesting a u-shaped function of the relevance of attachment relationships across the lifespan, peaking in infancy and old age.

Second, attachment research may contribute to a differential perspective on processes of socioemotional selectivity. Next to these normative developments put forward by SST, attachment-informed reasoning would add a differential stance to the interpretation of findings. Focusing on individual differences could further complement this macro-developmental theory of aging that assumes a normative shift in social motivation across the

lifespan due to a more limited future-time perspective (Carstensen et al., 1999). In that, attachment-informed aging research may more strongly focus on merging developmental and differential perspectives on aging. It could be explored if this mechanism to stabilize well-being works differently for those who are relatively securely attached in contrast to those who are relatively insecure. For example, individuals with relative secure attachment may more strongly benefit from emotional closeness and social support given from these smaller networks in old age. Individuals who face greater challenges to experience interpersonal closeness as rewarding, i.e., those who display insecure attachment, may more strongly rely on different resources to maintain well-being.

Second, a significant proportion of developmental tasks and challenges encountered in old age are tangent to attachment, leveraging its relative importance for well-being in old age (Havighurst, 1953; Hutteman, Hennecke, Orth, Reitz, & Specht, 2014). For example, even for those adults that maintain high status of health in late life, aging is characterized by functional decline in various cognitive or physical abilities. These may sooner or later manifest themselves in heightened dependency needs. Accepting dependency in oneself and granting others' dependency needs is essential to caregiving- and receiving and, therefore, directly links aging to attachment (Baltes, 1996). Dependency needs have been shown to be more readily accepted and productively handled by those with secure attachment orientations (Feeney, 2007). Furthermore, attachment security is crucial during grief and loss, which in turn is most salient and ultimate in death bereavement and hence, normatively, tied most strongly to the later and latest stages of life (Bradley & Cafferty, 2001; Shaver & Mikulincer, 2012). After all, even under the best conditions, life and thus aging and even healthy aging will ultimately result in dying and death. Hence, examining healthy aging requires not cutting off this very last stage of life (cf. Wilkening & Martin, 2003). Preliminary evidence indicated

that secure attachment orientation in young and middle aged adults predicts reduced death anxiety in oneself and reduced complicated mourning in bereavement (Mikulincer, Florian, & Tolmacz, 1990; Wijngaards-de Meij et al., 2007). Attachment theory may prove as a conceptually rich framework to examine these topics related to the anticipation of one's own death or the death of loved ones that become a major topic during the last stages of life. Finally, next to these aspects associated with loss and decline, positive events associated with late life such as life-reviewing, generativity, or role-transition into grandparenthood are in essence attachment-related (Havighurst 1953; McCormick, Kuo & Masten, 2011).

7.5.2. Attachment as a Micro-Longitudinal Theory of Healthy Aging: Psycho-Dynamic Systems Modeling

The WHO's (2015) definition of healthy aging is concerned with multiple domains of both psychological and physical functioning, and adaptation that ultimately contribute to healthy aging as a highly complex and multifaceted process. The dynamic process of healthy aging calls for research designs and statistical methods capable of depicting these psychological processes related to health in real life (Nesselroade, Gerstorf, Hardy, & Ram, 2007; Mehl & Conner, 2012). In the last years, great advances in the field of measuring and modeling health-relevant processes in daily life have been made (e.g., Epskamp, Borsboom & Fried, 2017; Gates & Liu, 2016; Molenaar & Nesselroade, 2015). For example, dynamic systems research focuses on the non-linear processes unfolding within a complex system over time (Thelen & Smith, 2006). Applied to psychological research, it aims to depict an aspect of human functioning as emerging from the interaction of multiple and mutually influential components on multiple embedded timescales (Boker & Wenger, 2007). Functioning is understood as a product of multiple components brought together in a moment of time based on particular contexts, challenges and history of this organism (Kelso, 1995). Dynamic

systems modeling (DSM) thus seem especially promising to represent the complex dynamics of healthy aging.

However, next to methodology that allows for adequate measurement of micro-longitudinal processes within an individual, healthy aging research is also in need of theoretical foundations which put processes of micro-development of one single individual into the center of observation. Psychodynamic theories are characterized by this type of idiographic reasoning (Trop, Burke, & Trop, 2013). Psychodynamic theories strive to understand human functioning resulting from the interaction of *all* affective, cognitive and behavioral tendencies within the person (e.g., Erikson, 1959; Palombo, 2016). Apparently, attachment theory is a psychodynamic theory, holding various assumptions on dynamic processes unfolding within an individual across time (Barber & Solomonov, 2016; Shaver & Mikulincer, 2005).

Healthy aging research might benefit from operationalizing *psychodynamic processes* with the help of *dynamic systems modeling* to better understand micro-longitudinal processes of adaption. Multivariate DSM of the innate dynamics of a person's functioning related to his or her ability to adapt and self-manage (cf. Huber et al., 2011) should offer new insights into how healthy aging unfolds within the individual. Making use of a synergy of the methodological rigorousness of sophisticated quantitative methods such as DSM together with the deep-thought and complex conceptual rationale of psychodynamic theory on the innate functioning of individuals in their natural world should advance aging research enormously. In sum, an empirically valid approach to study micro-processes of healthy aging needs both idiographic methodology *and* idiographic theory. Healthy aging research should benefit from what this thesis terms *psycho-dynamic systems modeling.*

7.6. Implications

The implications of this thesis are twofold. First, the thesis informs research on healthy aging on micro- and macro-longitudinal associations between attachment security and two domains of functional ability. These lay the basis to further explore person-centered approaches examining how attachment security relates to flexibility in balancing and shifting strategies (Kashdan & Rottenberg, 2010), to functional quality of life (*f*QOL; Martin, Schneider, Eicher & Moor, 2012), to homeostasis and stabilization of health (Martin, Jäncke, Röcke, 2012; 2016; Martin & Moor, 2012), and how it relates to actual health behaviors and even health behavior change (Bierbauer et al., 2016; Inauen, Shrout, Bolger, Stadler, & Scholz, 2016; Schwarzer, 2008).

Second, this thesis ultimately addresses the question of which role attachment security plays within the broader social dimensions of healthy aging as well as which role attachment security as an intrinsic capacity may play within a public health framework. The WHO's (2015) suggested public-health framework of healthy aging addresses the implementation of health services, long-term care and creation of environments to promote healthy aging. Public health actions in these three domains should be applied across the *second half of life* to support declining capacities or functional ability (cf. WHO, 2015). However, as an intrinsic capacity, attachment security is not declining with age (Magai, 2008). Together with prior research, the findings of this thesis suggest that across life, attachment security is linked to increased functional ability in at least two domains. Hence, public health actions to promote healthy aging may not necessarily be timed to commence by the beginning of individuals' second half of life. In line with the logic of both attachment theory and the WHO's definition of healthy aging, public health actions to promote healthy aging might already start in in early infancy, respectively during the *first half of life*.

7.7. Conclusion and Final Remarks

The WHO (2015) definition assumes that healthy aging starts at birth due to the genetic inheritance of the individual. Attachment theory and research also assumes that healthy aging starts at birth, while suggesting that environments in terms of early caregiving experiences are the major force driving subsequent processes of successful development and adaption to life. Rather than highlighting this definitional discrepancy of the starting point of healthy aging and thus setting the stage for a nature-nurture debate (cf. Coll, Bearer, & Lerner, 2014; Pastore, 1949), this thesis aims to close with hinting at the fact that both attachment research and the WHO (2015) understand healthy aging as a comprehensive and lifelong process.

While employing the WHO's (2015) definition of healthy aging, this thesis made use of the rich and complex attachment-theoretical viewpoint on human development, yielding novel findings on how attachment-security as an intrinsic capacity relates to functional ability in middle and old age and thus, healthy aging. Attachment security is positively associated with increased functional ability in two domains that are crucial for well-being of older adults, such as (a) relationship maintenance and (b) basic need satisfaction (cf. WHO, 2015, p. 30). First, attachment security links to forgiveness as a disposition and everyday behavior in intimate relationships in adults. Second, being secure in daily life is coherent with feeling related, autonomous and competent in older adults. Results coincide at the micro- and macro-longitudinal level as well as at the within-and between-person level. Moreover, helping to improve functional ability with regard to forgiveness leads to increases in mental health and well-being. Efforts to promote forgiveness may be even more helpful for those who are relatively securely attached. After all, the empirical Studies 1 to 4 confirm the initial hypothesis put forward in this thesis and suggest that attachment security contributes to

healthy aging in terms of relationship maintenance and need satisfaction in middle aged and older adults.

By relying on attachment theory as a framework to generate empirical evidence on processes of healthy aging, knowledge and insights on the causation, function, and ontogeny of these mechanisms can be addressed. The current thesis can be viewed as a *proof of concept* for the notion that attachment theory and research can substantially and most fruitfully contribute to an enhanced psychological understanding of healthy aging, its underlying processes and how these can be sustained and promoted in the individual.

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9. Appendix

9.1. Appendix A: An overview of the intervention structure and the main activities for both guided self-help intervention conditions (Study 4)

Group Session 1

Steps	Content/description	Intent/goal	Modality
1.	Introduction, ground rules for the guided-self group intervention and overview of the intervention		
2.	Discussion of inter- and intraindividual differences in reactions to interpersonal transgressions • How do people react to a transgression? • How do *you* typically (or in a specific situation) react to a transgression?	• To understand different reactions to interpersonal transgression and to clarify one's own perspective and behavior	Group discussion
3.	Defining what forgiveness is and what it is not by comparing forgiveness with related concepts such as forgetting and reconciliation	• To understand what forgiveness is (and what it is not) • To avoid confusion and further victimization due to misunderstanding of concepts	Exercise followed by a group discussion
4.	Theoretical input about psychological models of forgiveness and forgiveness research • Which model fits best to your behavior? • Is it always the same model or is it situation-, person- or relation-specific? • Which factors do have an influence on your forgiveness?	• To get to know possible factors that influence forgiveness, reasons and benefits to forgive • To reflect one's own forgiveness behavior	Theoretical input with individual reflection followed by a group discussion

Group Session 2

Steps	Content/description	Intent/goal	Modality
1.	Introduction and overview of the second session • How did you feel the last few days?		Dialogue
2.	Recall the hurt • What exactly happened? • Which emotions, thoughts and behavior did this transgression evoke/produce? • How intense was the transgression when it happened (and how intense is it actually)?	• To clarify the transgressive situation • To reduce the pain of the offense	Individual reflection and examples of transgressions of the participants
3.	Attribution patterns and typical reactions • Exercise: Tell the other group members a story about a personal success and a personal failure. In the next step, think (and then tell) the reason of this successful and failed event. (Afterwards presentation of the different attribution patterns and their consequences)	• To enhance the understanding of the own attribution patterns and thoughts	Exercise
4.	Broadening the view of the transgressor: Change of perspective and building empathy with a fictive transgression situation • Exercise: Please put yourself into the place of the hurt person: How would you feel? What would you think and do?	• To change the perspective and to build empathy for the transgressor	Exercise and group discussion of a fictive transgression, encouraging the participants to reflect on their transgression situation
5.	Contextualism and long-term perspective of a transgression (according to Baumann & Linden, 2008) • What could be a typical approach to this transgression for a grandmother, a manager, or a psychologist? • Imagine that in some years, the hurt person will write a biography. How will she/he describe the situation then? • Painting a lifeline, for example with valleys, peaks and all the important events: do you count more positive or more negative events? Are there other	• To reduce negative feelings and cognitions such as anger, bitterness by creating distance and thinking of different and even positive perspectives	Exercise and group discussion; working with the fictive example first, then with the transgressions reported by the participants

	transgressions that were intense when they occurred but are painless now?		
6.	Acknowledgment of one's own offenses (nobody is perfect) • Did you offend or hurt someone and regret it? • How did you feel? • Did you wish to be forgiven? • Can you describe the feeling of being forgiven (or not being forgiven)?	• To remember how it feels to wish and receive forgiveness from another person	Individual reflection followed by a group discussion

Group Session 3

Steps	Content/description	Intent/goal	Modality
1.	Introduction and overview of the third session • How did you feel the last few days?		Dialogue
2.	Recall the hurt • What exactly happened? • Which emotions, thoughts and behavior did this transgression evoke/produce? • How intense was the transgression, when did it happened (and how intense is it right now)?	• To clarify the transgression situation • To reduce the pain of the offense through catharsis	Individual reflection and examples of transgressions of the participants
3.	Perception and acceptance of emotions • Which emotion(s) did you have regarding the transgression? • Persons differ in their typical emotion patterns: Do you know and accept your typical emotion patterns?	• To understand and clarify one's own emotions and emotional patterns	Short theoretical input followed by an individual reflection
4.	Life review • Sketching a "lifeline" • Embedding the transgression within this life story	• Acceptance of this transgression within one's lifestory, feeling of continuity and "making sense" of the event	Individual exercise followed by a group discussion
5.	Encouraging a commitment to forgive the transgressor • Remember the benefits of forgiveness. Imagine how you would feel	• To keep forgiveness as a goal	Individual reflection and group discussion
6.	Integration, Feedback and take-home message		

9.2. Appendix B: An overview of the unique components and the related activities of the guided self-help intervention conditions (Study 4)

Learning-Oriented Intervention Condition

Component	**Literature**	**Content**
1. Listing major components which influence forgiveness	Based on "learning-oriented" respective "evocative" therapies (e.g., Frank & Frank, 1991), such as psychodynamic, person-centered and interpersonal therapies (e.g., Young, Klosko, & Weishaar, 2003; Messer & Warren, 1995; Raskin, Rogers, & Witty, 2008)	Understanding psychological underpinnings of forgiveness, defining forgiveness as a multidimensional construct and recognize variables which influence forgiveness
2. Recall forgiveness-relevant childhood memories		Remember forgiveness-relevant events in childhood, reflecting which reaction patterns have been learned, and compare them to actual forgiveness behavior to understand and clarify one's own perspective and behavior
3. Reanalysis of the transgression		Recall the transgression from a imagined "third person's" perspective
4. Reflecting the process of clarification		Remember forgiveness-relevant events in childhood, reflecting which reaction patterns

Action-Oriented Intervention Condition

Component	**Literature**	**Content**
1. Defining "forgiveness" as a coping strategy		Listing different (behavioral) coping strategies, recognize coping strategies as learnable instruments to increase well-being
2. "The safe place"	Reddemann (2009)	Practicing a relaxation-exercise to cope with intrusive thoughts because of the transgression; empowerment and experience positive effects of cognitive and affective distancing from the transgression

3. „My resources“	McWhirter (1994)	Empowerment and resource activation: List personal strengths and preferences
4. Circle chart to visualize strain	Wassmann (2013)	Problem analyses; Relate the amount of life-domains which are problematic because of the past transgression to those, which support well-being
5. Cost-benefit analysis	Nay (1995); Novaco & Jarvis (2002)	Individual analysis of the negative and positive outcomes of forgiveness in the specific situation; Identifying forgiveness as a process resulting in very beneficial outcomes for individual well-being

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